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# BLUE JAY

March 1993

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CN ISSN 0006-5099.

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**Cover**: Piping Plover chick. Photo by Keith Barr.

Published by the Canadian Plains Research Center, University of Regina. Printed by Merit Printing, Regina, Saskatchewan.

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# NATIVE PRAIRIE AND BIODIVERSITY IN SASKATCHEWAN

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Native prairie is essential to the conservation of biodiversity and Saskatchewan has an important role to play in the conservation of global biodiversity through the conservation of its prairies. In spite of this, native prairie in Saskatchewan is lost every year to cultivation, roadside improvement and wildlife habitat management.

There are several scientific definitions of diversity, but a simple, practical definition is simply the number of species present in an area.

The mixed-grass prairie of Saskatchewan appears to have low diversity, compared to a tropical rainforest or a coral reef. I suggest that this is a matter of scaling. If humans were the size of grasshoppers, the prairie would look pretty diverse.

First, there are many kinds of grass in native prairie: tussock grasses (e.g., spear grass) and sod grasses (e.g., grama grass), cool season grasses (e.g., junegrass) and warm season grasses (e.g., little bluestem).[8] One of the commonest "grasses" isn't a grass at all, but a sedge.[7] Then there are many, many wildflowers.[12] Several of these are nitrogen fixers. There are shrubs such as creeping juniper and prairie rose. In dry areas, most of the biomass is composed of lichens and clubmosses (Selaginella).[13] Lastly, a tablespoon of prairie soil can contain over 1,000,000 algae cells, not to mention fungi.[6] So there is a lot more to prairie plant diversity than just grass.

All this plant diversity directly affects the diversity of insects, mammals and birds. A very rough rule of thumb is that there may be four species of herbivores and carnivores for every species of plant.[4] One native prairie can hold 309 vascular plants, and thus, many animal species. Many of the insect species have not yet been named.[2,10]

Fire has no effect on the diversity of mixed-grass prairie, in contrast to tall-grass prairie where fire may increase diversity.[11,16] If used to remove invading shrubs, however, fire also increases diversity in mixed-grass prairie.[1]

Heavy grazing results in the loss of native prairie species. They may be replaced by European weeds, so the total diversity does not change.[3] This example shows, surprisingly, that diversity alone must not be used as a single criterion for the conservation of biodiversity. The biodiversity value of a plot with 30 native species on it is much greater than a plot with 30 weeds on it, because the weeds have been spread to many parts of the world (Europe, Asia, Australia, Africa, South America) whereas the native plants are found only on the Great Plains of North America. Thus, Saskatchewan has an important role to play in the conservation of global biodiversity.

Cultivation, of course, results in

the loss of native prairie and its biodiversity. Land that is abandoned from cultivation will continue to sustain low diversity. It may be planted to brome grass or crested wheatgrass, or it may be invaded by an European perennial such as leafy spurge.[5] Either of these events results in the loss of both plant and bird diversity.[14,15] The widespread replacement of native prairie along roadsides and in wildlife management areas with European species has a similar effect.

Native prairie may not return to land that has been cultivated for a few years, due to the extermination of both prairie plants and their seeds. Only half of the fields near Swift Current abandoned from cultivation for 40 years contained some native plants.[9] The density of natives was extremely low: 95% of the plants were European.

Native prairie is very diverse compared to cultivated land or tame grass pasture. Native prairie is important to the conservation of global biodiversity. This diversity begins with the plants, but extends down to the soil microbes and up to the largest mammals and birds. It needs protection in Saskatchewan.

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# AGRICULTURAL POLICY: ITS EFFECTS ON NATURE, AGRICULTURE AND THE LAND IN SASKATCHEWAN

## INTRODUCTION

KEN PIVNICK, SNHS Endangered Species and Spaces Committee, 209 7th Street East, Saskatoon, Saskatchewan. S7H 0W9 and FRED THORNTON, JOCE BOWMAN, and DAVID STRUTHERS, Western Resource Management Associates Limited, Box 4-B Site 2, Yorkton, Saskatchewan.

Historically, people working in agriculture and those involved with the preservation of flora and fauna and their natural habitats have often viewed the landscape of Saskatchewan from conflicting perspectives. Recently, however, members of both groups have started to recognize that their respective aspirations for the land have enough in common that for either group to achieve its goals, both must achieve them. This has resulted from a realization that certain indicators within Saskatchewan's agricultural landscape, reflecting its overall health, are in decline. These include: the productivity of the land; water quality and quantity; the number of farms and rural communities; the quality of rural life; and the diversity and abundance of natural habitats. Indicators that are increasing include: the amount of cultivated land; the frequency of farm bankruptcy; the stress of rural life; the number of children of farm families that are permanently leaving the farm; the number of threatened or endangered species; and the number of undesirable, introduced species.

Society has failed to recognize the relationship between a healthy ecosystem and the agricultural viability we need to support ourselves. All people, from urban dwellers to prairie farmers, need to understand the ecological relationship between natural landscapes, abundant wildlife, fertile soil, water quality, excellent crops, stable income, ecosystem viability, and human well-being.

Several recent Canadian government studies have identified some of the major problems and the policies behind them.[1,2] They point out that modern agriculture is primarily concerned with short-term profit in a global economic arena over which individual producers have little or no control. Environmentally sensitive agricultural practices are perceived as profitable only in the long-term and this attitude hinders their adoption. Government policies exacerbate the situation by continuing to encourage traditional objectives, such as maximization of cultivated acres, despite the attendant problems of soil erosion, declining soil organic content, and loss of habitat.

These studies generally recommend that all sectors of the Canadian economy be educated on the interrelationship between the environment, natural resource sustainability (including agriculture), and economics. They promote the creation of committees and advisory boards to help integrate economic and environmental goals in policy and practice. In addition, the studies recommend continuing research and extension into: the reduction of soil erosion; reduced reliance on non-renewable energy, inorganic fertilizers and pesticides through more sophisticated technology; and intensified monitoring of environmental indicators. While these studies address the obvious problems, they do not deal with the root causes and consequently the public is allowed to believe that the problems can be solved without any fundamental changes in our life style and society's infrastructure. As one example, our society considers the economy unhealthy if it is not growing substantially. Yet our economy must soon begin to shrink; certainly it cannot grow indefinitely as its sustainable size is largely a function of the productivity and health of our environment.

The Saskatchewan Natural History Society (SNHS) Endangered Species and Spaces Committee is examining four federal and Saskatchewan government policies that relate directly to prairie agriculture: the Gross Revenue Insurance Plan (GRIP), the Canadian Wheat Board quota system, Saskatchewan rural municipal assessment and taxation policy and southern Saskatchewan crown land policy. In a series of articles in *Blue Jay*, these policies will be examined from a "holistic" perspective, defined by the fundamental measures of biodiversity, environmental sustainability and agricultural suitability. The maintenance of a landscape that includes endangered native prairie species and their habitats can only be successfully accomplished with integration into the broader context of agriculture and human society.

The purpose of this initiative is threefold. First, we hope to educate the SNHS membership with regard to present Saskatchewan land management policy and related issues. Second, we will point out some of the important interconnections between agriculture, policy, and the land and all its inhabitants. Third, we hope to provide tools to the membership to look beyond present land use practices and related policy to develop the public awareness, public pressure and the creativity necessary to develop and demand land use policy and practices which are healthy and sustainable.

1. GIRT, J. 1990. Common ground: recommendations for policy reform to integrate wildlife habitat, environmental, and agricultural objectives on the farm. Wildlife Habitat Canada. 56 pp.

2. LEBLOND, G. 1990. Growing together. Report to the Federal-Provincial Agricultural Committee on Environmental Sustainability. 41 pp.

# AGRICULTURAL POLICY REVIEW PART 1: GROSS REVENUE INSURANCE PLAN

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The economic viability of prairie farm operations has declined significantly over the past decade. In the early 1980s, farmers received the majority of their net income from the marketplace. Since 1985, however, marketplace revenues have declined and government programs have been implemented to support realized net farm income. This assistance has been provided by ongoing programs, such as crop insurance, and by *ad hoc* programs such as the Special Canadian Grains Program, the Canadian Crop Drought Assistance Program, and the Canada-Saskatchewan Crop Assistance Program.[2]

Current programs (ongoing and *ad hoc*) have run into deficit positions. These programs were not designed to handle the present situation which has come about as a result of international grain subsidies and declining farm gate prices. Spokespersons for the government, the agriculture industry, and producer groups have stressed the need for new farm safety net programs that meet the following criteria:

- predictability;
- cost-sharing by governments and producers; and
- resource neutrality.

As part of the ongoing process of agriculture policy review, a Grains and Oilseeds Safety Net Committee was established to design new income support programs that would meet the criteria above. The objective was to develop a safety net program that would smooth out fluctuations in net revenue arising from production and marketing risks beyond the farmer's control. The committee included representatives from the major producer groups (Western Canadian Wheat Growers, Canadian Wheat Board Advisory Committee, Canola Growers Association, National Farmers Union, United Grain Growers, Saskatchewan Wheat Pool), as well as representatives from the federal and provincial governments. The Safety Net Committee recommended two programs, the Gross Revenue Insurance Plan (GRIP) and the Net Income Stabilization Account (NISA). The more significant of these two is GRIP, a comprehensive insurance program that provides: production (crop yield) insurance and revenue (price) insurance.

The production insurance component has been available to Saskatchewan producers through the Saskatchewan Crop Insurance Corporation (SCIC) for over 30 years. Insurance is provided on the basis of long-term average crop yields, using either area-based or individual yield records. Under the area coverage option, coverage levels are based on

15 year moving average yields that SCIC has calculated for summerfallow and stubble cropping in each of 23 "risk" areas in the province. Higher coverage is offered for crops seeded on summerfallow than for crops on stubble. Under the individual coverage option, a producer's insurable yield level for each crop is determined by averaging 10 years of his/her individual yield records. In the event that a producer does not have 10 years of personal records, he/she must rely, in part, on the 15 year moving average yields for his/her "risk" area (area coverage). For example, a producer with 2 years of individual records would have to use 8 years of area records to calculate his/her 10 year yield averages. Each year the producer would use more of their own data, until such time as they had 10 years of personal records. Production insurance payments are triggered when uncontrollable natural hazards, such as drought, reduce crop yields below guaranteed levels.

The revenue insurance component was introduced as GRIP in 1991. Farmers used their individual 10 year crop yield records (their yield guarantees under production insurance) and a 15 year moving average price, indexed to the cost of farm inputs, to calculate a gross revenue insurance level per acre. As in the case of production insurance, producers with less than 10 years of personal yield records used yield data for their risk area to calculate coverage levels. The program was based on individual crop commodities (i.e., each crop was insured individually). Payments were triggered when the revenue received from the marketplace and from production insurance was below the insured revenue level. With the introduction of GRIP in 1991, farmers could choose between three program options: production insurance only, revenue insurance only, or a combined program that insured crop yield as well as gross revenue.

From an agro-economic perspective, the 1991 version of GRIP was criticized for two reasons:[1]

1) Market responsiveness - Ideally, farmers should make their annual planting decisions based on market signals. The mix of crops and livestock they decide to produce should be determined by market opportunities and the degree of risk they are willing to accept. Under the 1991 GRIP program, revenue insurance levels were crop-specific. This distorted cropping decisions by providing a direct incentive to produce those crops with the highest revenue guarantees, even if market demand was low or the producer had no prior experience growing the crop. This, combined with the fact that the program did not include forages, reduced incentives for crop diversification.

2) Moral hazard - Moral hazard occurs when a program or policy takes away the incentive to do the best job possible with a given set of resources. Under the 1991 GRIP program, guaranteed revenue levels were higher than the expected market revenues for all crops. With expected prices so low that there was little probability that market revenues could exceed the GRIP guarantee, producers had no incentive to grow a good crop. Instead, producers could choose to accept the guarantee and maximize income by minimizing expenditures for cropping inputs such as pedigreed seed, fertilizer, and pesticides.

To rectify these problems, the Saskatchewan government changed the GRIP program for 1992. Under the new program, production and revenue insurance remain as separate entities. Production insurance reverts to an annual program and producers can choose to insure some or all of their crops. The revenue insurance component operates like a deficiency payment. Benefits are determined from: producers' 10 year average yields; their SCIC risk area; crop(s) seeded; whether the crop is grown on summerfallow, stubble, or irrigated lands; and soil quality. Payouts and premiums are determined for a "basket of crop commodities" grown in a given risk area. Producers receive a regionally based acreage payment indexed to their individual 10 year yield information. Payouts are based on the number of seeded acres, regardless of the mix of crops that is grown. This approach is more market responsive since payments are not based on individual crops. Producers will tend to grow crops that will earn the highest market revenue. The risk of moral hazard is also reduced, since the annual payout is received for each crop grown, regardless of crop yields and market revenue. Producers will attempt to optimize crop yields through the use of inputs, since higher yields will result in higher economic returns.

**Potential impacts on the landscape** Despite the fact that the agricultural policy review process identified resource neutrality and environmental sustainability as key components of the framework for new programs and policies, the 1992 version of the Gross Revenue Insurance Plan has several flaws:

1) Land use - Currently, GRIP does not provide adequate disincentives to prevent undesirable changes in land use. Like many other programs, GRIP is acreage based. The payouts that producers receive are based on seeded acreage. The more seeded acreage a producer has, the more program benefits they will receive. In order to maximize program benefits, producers have two options:

a) They can increase the proportion of their cultivated acreage that is seeded by reducing the amount of summerfallow acres. This has positive implications in terms of soil conservation. Summerfallow tillage increases the potential for soil erosion losses and reduces the long-term productivity of the soil. However, producers with less than 10 years of personal yield records, who must use risk area data to calculate their long-term yield coverage levels, may have lower coverage if they decide to continuous crop, since the risk area data provides lower yield guarantees for stubble than for summerfallow.

b) They can expand their seeded acreage by converting tame forage, native grassland, wetlands, and wooded areas to cultivation. Under the revenue insurance component of the GRIP program, an annual seeded acreage cap is calculated for each producer. In any year, seeded acreage above this cap is not eligible for revenue insurance coverage. This acreage cap was designed to limit increases in seeded acreage above those normally occurring as a result of yearly fluctuations in weather, markets, etc. However, the cap does not prevent producers from continuing to expand their cultivated acreage base. Since the cap is based on the ratio between seeded and cultivated acres, producers can continue to gradually convert more land to cultivation without affecting their seeded acreage cap. As long as they maintain this ratio (or increase it), their entire seeded acreage in any given year will be eligible for revenue insurance coverage. The production insurance component of GRIP also facilitates these types of activities by providing yield coverage for fragile soils that are not suited to annual crop production. Canada Land Inventory (CLI) class 5 (improvable pasture) and class 6 (non-improvable pasture) qualify for production insurance the year that they are converted to crop land. The removal of natural vegetation and wetlands, along with the subsequent cultivation of these fragile soils, increases the potential for soil degradation and results in losses of wildlife habitat. These practices will also have serious negative implications for the functioning of the ecological processes that are vital to the sustainability of the prairie landscape.

2) Diversification - Diversification is a critical component of an economically and environmentally sustainable landscape. Diversification may involve longer crop rotations incorporating a broader range of crops, conservation tillage practices, and/or a better balance of cropping and livestock enterprises. Insurance programs tend to promote specialization over diversification by reducing the risk associated with investing all of one's resources into a single type of venture. In the case of agriculture, this has resulted in the misuse of land and other natural resources. Land that is best suited for livestock production and/or wildlife habitat has been converted to annual crop production. The GRIP program does not promote diversification. Forages, forage seed, tame pasture, and rangeland are not eligible for revenue insurance coverage. The exclusion of these crops results in an economic disincentive to integrate crop and livestock production and, in particular, to grow forages which provide good protection against soil degradation.

3) Soil conservation - There are two separate issues relating to the effects that GRIP may have on soil conservation:

a) Under area coverage, production insurance penalizes producers who adopt soil conserving practices such as extended crop rotations and/or conservation tillage by differentiating between stubble and summerfallow yield coverage levels. Higher coverage is offered on summerfallow crops than for crops on stubble. Also, if conservation practices result in lower yields over the short-term, producers will be faced with lower coverage levels and increased premiums.

b) By introducing a new set of incentives and disincentives, the GRIP program may influence land management decisions. Since the program is based on seeded acreage, producers may be reluctant to employ soil conservation practices that will take land out of production (eg. forage establishment, shelterbelts, etc.) even if it is the obvious best use of the land. In this respect, GRIP is in direct contradiction with government funded soil conservation and wildlife habitat programs such as the Save Our Soils program and the Permanent Cover Program.

**Possible Solutions** It is obvious that, despite the government's claim that all policies must be environmentally sound, the developers of the GRIP program did not give thorough consideration to environmental sustainability when they designed the program. The 1992 version offers some improvement in the area of market responsiveness and diversification, but there is still a need for further changes. The following suggestions are provided:

1) The seeded acreage cap should be revised so that producers can only increase seeded acreage by increasing the proportion of their current cultivated acreage that is seeded annually. Any additional land that is converted from native vegetation to cultivation should not be eligible for revenue or production insurance coverage.

2) Modify Crop Insurance policy so that fragile soils (CLI classes 5 and 6) do not qualify for coverage under either the production or revenue insurance components of GRIP. Insurance coverage for these lands could be phased out over a reasonable time frame (5 to 10 years), in conjunction with soil conservation programs such as the Permanent Cover Program and the Save Our Soils program.

3) Develop a method of including forages, forage seed, tame pasture, and rangeland in the program. This change was promised for 1992, but nothing has been done.

4) Reward soil conservation practices by increasing the stubble yield coverage to summerfallow levels under the area coverage option. This will provide farmers who do not have 10 years of personal yield history with an incentive to stubble crop, since they will not be penalized by lower coverage levels.

The Farm Income Protection Act legislation, which enabled GRIP and NISA, requires that an environmental assessment be conducted within two years of the programs inception. This process is currently being co-ordinated by the Bureau of Environmental Sustainability, Policy Branch, Agriculture Canada.

1. GRAY, R., W. WEISENSEL, K. ROSAASEN, H. FURTAN, and D. KRAFT. 1991. Proposed amendments to GRIP. Departments of Agricultural Economics, Universities of Saskatchewan and Manitoba. 12 pp.

2. MAKOWSKY, M. 1991. GRIP/NISA. Presented at the Saskatchewan Institute of Agrologists' 46th Annual Convention. April 11, 1991. Regina, Saskatchewan. 12 pp.

The Wisconsin nesting [of Passenger Pigeons in 1871] was the largest ever described, and its awesome dimensions have been at seventy-five to ten by fifteen miles, an area of no less that seven hundred and fifty square miles. Assuming a minimum average of twenty-five trees per acre and five pairs per tree, this single nesting was shared by 136,000,000 birds ... little more than one twentieth the size of the flight described by Wilson [in 1810]. ... The last wild pigeon in Wisconsin was taken in 1899... - *Peter Matthiessen. 1959. Wildlife in America. Viking, NY.* (Pp.159-160)

# 51st ANNUAL SASKATCHEWAN CHRISTMAS BIRD COUNT - 1992

Compiled by WAYNE C. HARRIS, Box 414, Raymore, Saskatchewan. S0A 3J0

Although the number of counts is down 20% to 80 from last year's record 99 counts, it is typical of the average for the past five years. In last year's compilation I requested -50°C with strong winds for future counts and gratefully my request was granted. The temperature plummeted from unseasonably warm temperatures in the precount period to -30° to -50°C for the entire count period and this was accompanied by strong winds on most days and as anticipated fewer people participated in counts, fewer counts were received, fewer species and numbers of individuals were reported.

**Weather and Coverage** Table 1 summarizes the weather conditions encountered on the counts. Most temperatures were in the -40° to -20°C range with but one plus temperature recorded for the entire count period. Winds were generally quite strong and combined with the low temperatures meant bitterly cold conditions for most of the counts. The most dramatic change in weather occurred at Leader 31 December when the temperature rose from -40° to 0°C during the count.

In spite of the cold conditions 528 observers turned out for the counts and they tallied 994 hours observing birds (see Count areas and Participants and Table 2). All of these are down from last year. Table 2 also summarizes the habitats covered on each of the counts.

**The Birds** There were 77 species reported on count day with an additional 7 species seen during the count period but not found on count day. Just over 61,000 individuals were reported, down about 18% from last year and 39% from the record 1991 numbers. Many people commented on the lack of birds and the figures certainly confirm these comments. Table 7 changes in numbers when 1992 results are compared to 1991 and to an average of the five year period from 1987 through 1991. The lack of winter finches was most notable with redpolls, crossbills and Pine Grosbeaks being scarce. Red Crossbills were absent from the count for the first time in at least 20 years. Even the most abundant birds such as magpies, Blue Jays, Ruffed Grouse, Sharp-tailed Grouse and Gray Partridge decreased substantially.

Saskatoon again led the way with the greatest variety of species with 34, compared to 42 last year. Fort Qu'Appelle and Regina were the only other counts to exceed 30 species, both with 32. The average number of species per count was a meager 14 count day and only 16 for count period.

The most frequently occurring species was again the Black-billed Magpie (76 of 80 counts), followed by Black-capped Chickadee (71) and House Sparrow (67). The most abundant bird was the House Sparrow

(14,277 individuals) followed closely by the Snow Bunting (13,134). Tables 3, 4 and 5 provide details of the 1992 counts.

**New Species** In spite of the extreme conditions two new species were added to the all time list bringing the total to 160 species. The first new species was a Lincoln's Sparrow recorded as a count period species at Whitewood. This individual had been present at a feeder up until the cold weather hit and then disappeared 18 December.

The second new species was the House Finch reported from both Regina and Weyburn. The Regina birds were found on count day but at Weyburn they were reported only as additional species for count period. The House Finch has been expanding its range throughout North America and it appeared only to be a matter of time before they were found in Saskatchewan during the winter.

**Rare Species** Several species though not new do warrant mention. A Yellow-billed Loon was present at Gardiner Dam for the second year in a row and like last year's record was an immature which would seem to preclude this being the same individual. A count period Great Blue Heron at Crooked Lake was only the third count record. A count period Varied Thrush at Swift Current was only the eighth count record. Several new high counts were recorded and these are found in Table 6.

**Count Areas and Participants** (Names of compilers are in italics. Number of participants in each count are in parentheses following the names.)

1. ABERNETHY-KATEPWA LAKE. *Ron Bittner*, Ron Hooper, Joy McKen, Norm McKen, Richard Price, Keith Stephens, Wanda Steuk. (7)
2. ARMIT. Valeri Harris, *Wayne Harris*. (2)
3. BETHUNE. *Doug and Vera Laing*. (2)
4. BIGGAR. Mary-Anne Assailly, Roger Assailly, Penny Dyck, Greg Goring, Art Schmirler, Shirley Schmirler, *Guy Wapple*, Robert Wapple, Sandra Wapple. (9)
5. BIG MUDDY LAKE. Martin Bailey, *Carol Bjorklund*, Jill Forrester, Wayne Harris, Sheila Lamont. (5)
6. BIRCH HILLS. Marg Mareschal, *Moe Mareschal*. (2)
7. BROMHEAD. Martin Bailey, *Carol Bjorklund*. (2)
8. CABRI. *Carman Dodge*. (1)
9. CANDLE LAKE. *Burke Korol*, Harv Lane. (2)
10. CLARK'S CROSSING. Muriel Carlson, Bernie Gollop, Al Hartley, Menno Nickel, Ole Nielsen, Elsie Rayner, Stan Shadick, Wayne Shiels, Hilda Voth, Jim Wedgwood, Bob Whatley, Kay Whatley, *Michael Williams*, Lois Wooding. (14)
11. CRAVEN. Martin Bailey, Margaret Belcher, Al Binney, Betty Binnie, Carol Bjorklund, *Trevor Herriot*, Phyllis Isley, Bob Kreba, Ferne Lawrence, Jack McKenzie, Ron Myers, Frank Switzer. (12)
12. CROOKED LAKE. Dale Hjertaas, Estelle Hjertaas, Kerry Hjertaas, Warren Hjertaas, Bill Livsay, Martha Livsay, *Dorothy Skene*, Ed Skene. (8)
13. DILKE. Gary Barss, *Margaret Belcher*, Ken McArton, Bertha Wilson. (4)
14. DUVAL. George Herber, Linda Korytko, Iain Richardson, *Lloyd Saul*. (4)

15. EDAM. *Marg and Tom Terpstra.* (2)
16. ENDEAVOUR. *Norman Harris.* (1)
17. ESTEVAN. *Guy Wapple.* (1)
18. FENTON. *Carman Dodge.* (1)
19. FIFE LAKE. *Martin Myers*, Robert Rafuse. (2)
20. FORT QU'APPELLE. John Banick, Phyllis Bordass, William Bordass, Errol Cochrane, Ethel Cockwill,, Anne Davies, Evelyn Flemming, Doug Harman, *Ronald Hooper*, Jared Kaye, Vic Lamontagne, Jim Larocque, Maurice Lindgren, Don McDougall, Jean McKenna, Alan Mlazgar, Dolores Palmer, Paul Paquin, Lorne Rowell, Lloyd Talbot. (16)
21. FORT WALSH. Anne Harris, Valeri Harris, Wayne Harris, Burke Korol, Sheila Lamont, Wilkes Parsonage, Brenda Pollock, John Pollock, Dan Sawatzky, *Guy Wapple*, Robert Wapple. (11)
22. GARDINER DAM. Anne Harris, Valeri Harris, Wayne Harris, Burke Korol, Sheila Lamont, Wilkes Parsonage, Brenda Pollock, John Pollock, Dan Sawatzky, *Guy Wapple*, Robert Wapple. (11)
23. GOOD SPIRIT LAKE. *Bill Anaka*, Joyce Anaka, Julia Wiwchar. (3)
24. GOVENLOCK. Anne Harris, Valeri Harris, *Wayne Harris*, Burke Korol, Sheila Lamont, Wilkes Parsonage, Brenda Pollock, John Pollock, Dan Sawatzky, Guy Wapple, Robert Wapple. (11)
25. GRAND CENTRE - PIERCELAND. *Frank Roy*, Heidi Roy, Jessica Roy, Kathy Roy, Ryan Roy. (5)
26. GRASSLANDS NATIONAL PARK. Anne Harris, Valeri Harris, *Wayne Harris*, Sheila Lamont. (4)
27. HUDSON BAY. Moe Alain, Yvonne Alain, *Pat Beaulieu*, Gerry Coates, Gerry Shuberg, Gloria Stang, Wayne Thacker. (7)
28. HUMBOLDT. *Ed Brockmeyer*, Mike Volk. (2)
29. INDIAN HEAD. Jan Beattie, Denise Beaulieu, Margo Beaulieu, Paul Beaulieu, Vic Beaulieu, Angela Gehl, David Gehl, Gordon Howe, *John Kort*, Peter Kort, Annette Meier, Lorne Scott, Anne Willerth, Gordon Willerth, Garth Willoughby, Jackie Willoughby. (17)
30. KAMSACK. John Barisoff, George and Marj Bernard, Ages Betz, Mike and Sally Bishop, Mable Buceuk, Lindee Duwore's, Bert and Doris Franklin, Anita Klocko, Bill Koroluk, W.J.C. May, Helen Panchuk, Dallas, Kelsey and Riley Rezansoff, *Isabel Ritchie*, Elsie Severson, John Solmon, Elenor Sookocheff, Phillyas Ward, Ann and Gordon Wlasichuk. (24)
31. KELVINGTON. Chester Sloan, *Dianne Sloan*, Marguerite Sloan, Pat Finnie. (4)
32. KENASTON. Doug Beckie, *Lawrence Beckie.* (2)
33. KINDERSLEY. Gerry Essar, *Michael Essar.* (2)
34. KINLOCH. *Don Forbes*, Doreen Forbes, Alice Rodenberg, Wilf Rodenberg. (4)
35. KUTAWAGAN LAKE. *Wayne Harris*, Sheila Lamont. (2)
36. LARONGE. *Jim Paul*, Lorie Ann Paul. (2)
37. LAST MOUNTAIN LAKE N.W.A. *Wayne Harris.* (1)
38. LEADER. *Daisy Meyers.* (1)
39. LIVELONG. *Sarah Pavka*, Vicky Tollefson. (2)
40. LOON LAKE. *Bruce Lyle.* (1)
41. LOVE-TORCH RIVER. *Bert Dalziel*, Duke Dalziel, Joan Dalziel, Kari Dalziel, Nora Dalziel, Sara Dalziel, Betty Donovan, Bruce Donovan, Sean Donovan, Ernie Hall, Viola King, Conrad

L'Heureux, Elene L'Heureux, Paul L'Heureux, Terry Lazaruk, Mildred Long, Bill Matthews, Lynn Matthews. (18)

42. LUSELAND. Bill Frey, *Kim Finley*, Estelle Martfeld, Travis Martfeld. (4)
43. MACDOWALL. *Myron Barton*, Val Drummond, Henry Neudorf. (3)
44. MARSDEN. Eileen Graham, Candi Schopfer, *Lois Wooding*. (3)
45. MEADOW LAKE. Denise Saraur, Ann Sequin, Randy Sequin, Robbie Sequin, *Bob Wilson*, George Wood, Gladys Wood. (7)
46. MELFORT. *Frieda Markland*. (1)
47. MELVILLE. Donna Alberts, Ruby Alberts, Bill Barmby, Marion MacLean, Ainslie Wotherspoon, Robbie Wotherspoon, *Ross Wotherspoon*. (6)
48. MISSINIPE. Kathleen Callin, Joesph Glass, *Shirley Glass*. (3)
49. MOOSE JAW. Andy and Vi Anderson, Edith Bell, Doug and Helen Brunsdon, Muriel Dormer, Al Gurnsey, Mary Hembroff, Eve King, *Leith Knight*, Connie and Hugh McIntyre, Ramsay Ross, Arnie, Henry, John and Rob Van Dorland, Ed and Grace Walker. (19)
50. MOOSE MOUNTAIN. *Ray Belanger*, Greg Bobbitt, Ross Douglas, Dick Gutfriend, Phil Layh, Keith Sakatch, Stewart Stairmand. (6)
51. NICOLLE FLATS. Randi Edmonds, *Alan Smith*. (2)
52. NIPAWIN. Vi Budd, *Joyce Christiansen*, Doug Pegg. (3)
53. PIKE LAKE. Muriel Carlson, Mary Gilliland, *Bernie Gollop*, Mike Gollop, Debbie Lashta, Kevin Moore, Menno Nickel, Frank Roy, Stan Shadick, George Tosh, Jim Wedgwood, Lois Wooding. (12)
54. PORCUPINE PLAIN. Les Baker, David Black, Frank Gabriel, *Donald Hooper*, Keith Larwood, Pat Larwood. (6)
55. PRINCE ALBERT(A). *Elsie Morton*. (1)
56. PRINCE ALBERT(B). Carol Beck, Ron Beck, John Burt, Pam Burt, *Carman Dodge*, Keith Dodge, Joe Graumans, Tim Loran, Ted Snow. (9)
57. PRINCE ALBERT NATIONAL PARK. Bruce Attikin, Susan Carr, Dave Dalman, Mary Dalman, Pat Fargey, Mark Kochems, Gail Lancaster, Howard Lancaster, *Bradley Muir*. (9)
58. QU'APPELLE VALLEY DAM. Bob Plaster, Frank Roy, Stan Shadick, *Michael Williams*. (4)
59. RAYMORE. Anne Harris, Valeri Harris, *Wayne Harris*, Sheila Lamont. (4)
60. REGINA. Jessie Bailey, Martin Bailey, Margaret Belcher, *Carol Bjorklund*, Joanne Bonneville, Lionel Bonneville, Stephane Bonneville, Tanis Davey, Jill Forrester, Malcolm Hayes, Trevor Herriot, Dale Hjertaas, Paule Hjertaas, Phyllis Ilsley, Olaf Jensen, Bob Kreba, Linda Hoyer Langenbacher, Rick Morrel, Ron Meyers, John Pollock, Tom Riffel, Margaret Skeel, Frank Switzer, Ian Switzer. (24)
61. REGINA BEACH. *Daryl Johannesen*. (1)
62. ROUND LAKE. *Doug Francis*, Joe and Laura Grimeau, Olga McDonald, John Trembley. (5)
63. SASKATOON. Tony Allen, Juhachi Asai, Kengo Asai, Rika Asai, Sumiko Asai, Garth Besant, Joyce Besant, Robert Besant, Ray Bisha, Alice Boehm, Tony Diamond, Ed Driver, Anne Dzus, Fran Eldridge, Melanie Elliott, Martin Gerard, Silvia Gerard, Colleen Gerwing, Marshall Gilliland, *Mary Gilliland*, Sean Gilliland, Bernie Gollop, Madeleine Gollop, Jerry Haigh, John Hanbidge,

Darlene Hay, Jim Hay, David Houston, Margaret Houston, Mary Houston, Stuart Houston, Grev Jones, Louise Jones, Venta Kabzems, Burke Korol, Rob Lavender, Cathryn Miller, David Miller, Lisa Napier, Garth Nelson, Menno Nickel, Shelly Ord, Steve Ord, Edith Rickman, Jim Smart, Jennifer Taylor, Phil Taylor, Grace Verrall, Heather Wagg, Jim Wedgwood, Shirley Wedgwood, Gordon Wilkinson, Joyce Wilkinson, Michael Williams, Dan Zazalenchuk. (55)

64. SCOTT. *Guy Wapple.* (1)
65. SKULL CREEK. Mark and Moreena Bell, Frank Ballauf, *Jim Bennetto*, Ray Bennetto, Bob Eccleston, Dorothy Eccleston, Greeba Drever, Rueben Flaig, Phyllis Flaig, Doris Bircham, Ralph Bircham, Bob Mann, Betty Mann, Marjorie Mann Jr., Pete Robertshaw, Patty Robertshaw, George Schultze, Ray Shuller, Michelle Shuller, Bret Wagner, Correy Wasilow, Harvey Wasilow, Mark Wasilow, Wade Wasilow, Brad Wolfater, Robin Wolfater. (25)
66. SNOWDEN. Irene Hagel, *Karen Hagel*, Hans Lien, Violet Lien, Sharon Lindberg, Lloyd Saul, Harold Thompson, Irene Thompson. (8)
67. SOMME - NEELY LAKE. Sharon Birch, Dawn Billeter, Edwin Billeter, Shirley Billeter, Louise Butterfield, *Donald Hooper*, Margaret Hooper. (7)
68. SPALDING. *Velma Spizawka*, William Spizawka. (2)
69. SPINNEY HILL. *Ed Driver*, Phil Taylor. (2)
70. SPRING VALLEY. Allan Bogdan, *Flossie Bogdan*, Larry Bogdan, Nick Bogdan, Dean Goian. (5)
71. SPRUCE HOME. *Sharon and Tom Dice.* (2)
72. SQUAW RAPIDS. Bert Dalziel, Joan Dalziel, Anne Harris, Valeri Harris, *Wayne Harris*, Burke Korol, Sheila Lamont, Guy Wapple, Robert Wapple. (9)
73. SWIFT CURRENT. *James Beattie*, Meryl Campion, Sara Froese, Ron Jensen, Doris Thoreson, Lois Wall, Russ Wall, Kae Waters, John Weston, Pearl Weston. (10)
74. TISDALE. *Joyce Mohr.* (1)
75. TURTLE LAKE. *E.M. Robinson.* (1)
76. VAL MARIE. Merv Hey, *Jacques Saquet.* (2)
77. WEYBURN. Leo Belanger, Louise Belanger, *Ray Belanger*, Greg Bobbitt, Norman Flaaten, Dick Gutfriend, Harry Kapasianyk, Norma Kapasianyk, Grace Kurtz, Betty Layh, Phil Layh, Bob Luterbach, Nick Postey, Keith Sakatch, Stewart Stairmand. (15)
78. WHITE BEAR. Daryl Jordheim, *Sig Jordheim.* (2)
79. WHITEWOOD. Pat Connelly, Boyd Metzler, *John Pollock.* (3)
80. YORKTON. Art Griffith, Russell Griffith, Dale Hjertaas, Kerry Hjertaas, *Warren Hjertaas*, Kenn Kozak, Roslyn Kozak, Geoff Rushowick, Patrick Rushowick, Dorothy Skene, Edward Skene, Duane Theaker, Sarah Theaker, Harold Wilkinson, Wilma Wilkinson. (15)

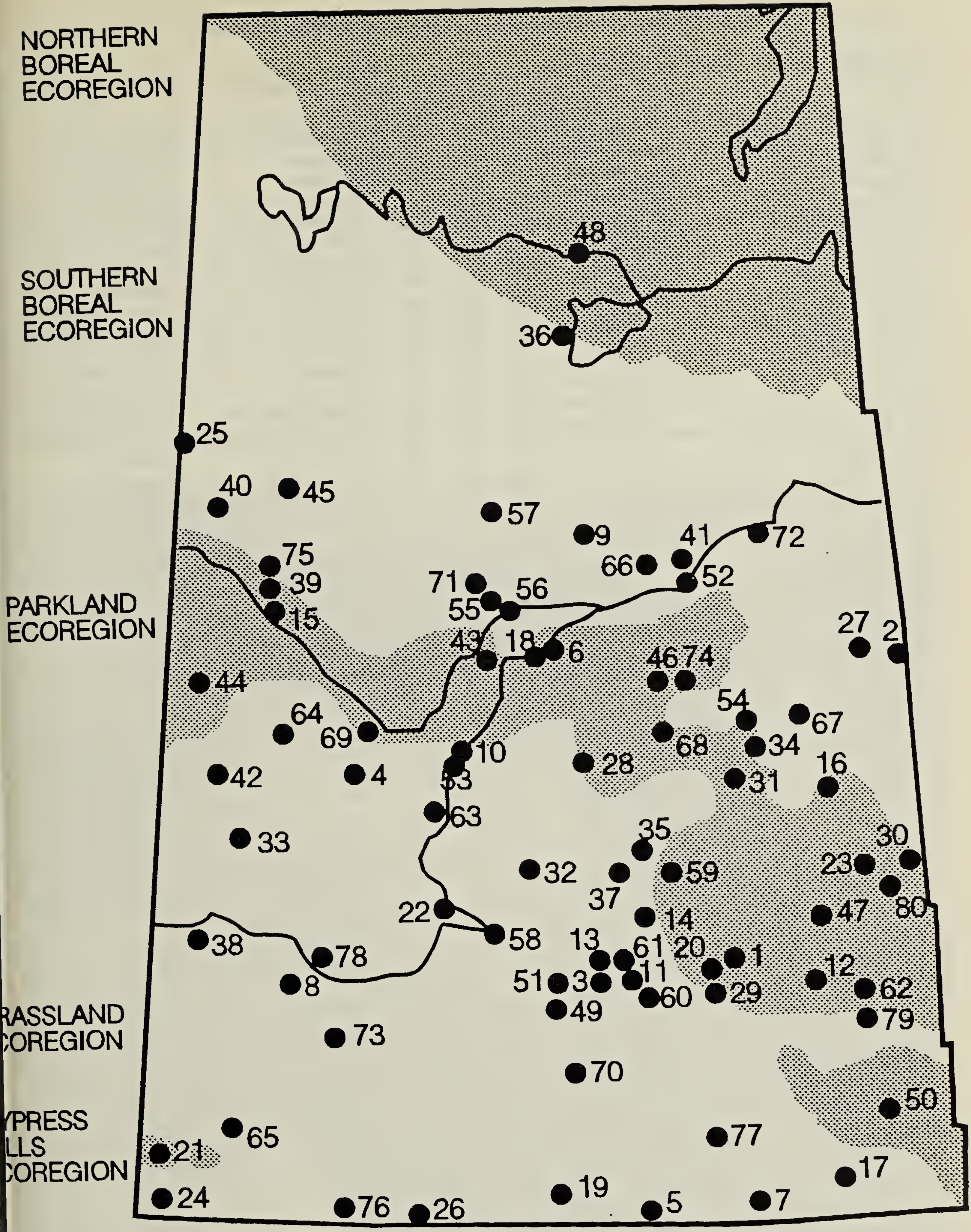


Figure 1. Location of 1992 Counts (numbers refer to locations on pages 11-14).

Table 1. COUNT WEATHER CONDITIONS (T°C, Wind kmph, Snow cm)

| LOCALITY | Min. T°C | Max. T°C | Min. Wind | Max. Wind | Min. Snow | Max. Snow | Sky A.M. | Sky P.M. |
|---|---|---|---|---|---|---|---|---|
| 1. ABERNETHY-KATEPWA LAKE | -33 | -22 | 10 | 15 | 12 | 15 | mostly clear | clear |
| 2. ARMIT | -24 | -15 | 30 | 60 | 25 | 30 | overcast | mostly cloudy |
| 3. BETHUNE | -18 | -16 | 15 | 20 | 20 | 30 | overcast | mostly clear |
| 4. BIGGAR | -46 | -35 | 5 | 10 | 15 | 31 | clear | clear |
| 5. BIG MUDDY LAKE | -18 | -4 | 0 | 8 | 0 | 10 | mostly clear | clear |
| 6. BIRCH HILLS | -29 | -28 | 5 | 5 | 20 | 30 | clear | clear |
| 7. BROMHEAD | -23 | -12 | 15 | 25 | 0 | 10 | partly cloudy | partly cloudy |
| 8. CABRI | -24 | -20 | 10 | 30 | 8 | 10 | partly cloudy | partly cloudy |
| 9. CANDLE LAKE | -15 | -11 | 0 | 5 | 20 | 30 | clear | mostly cloudy, light snow |
| 10. CLARK'S CROSSING | -30 | -23 | 0 | 19 | 10 | 25 | clear | clear |
| 11. CRAVEN | -28 | -22 | 5 | 20 |  |  | clear | clear |
| 12. CROOKED LAKE | -23 | -17 | 5 | 10 | 15 | 20 | overcast | overcast |
| 13. DILKE | -33 | -32 | 10 | 15 | 2 | 20 | overcast | overcast, very light snow |
| 14. DUVAL | -29 | -26 | 0 | 8 | 8 | 40 | overcast, mod. snow | overcast, heavy snow |
| 15. EDAM | -44 | -30 | 30 | 35 | 10 | 12 | mostly cloudy, mod. snow | overcast, mostly cloudy |
| 16. ENDEAVOUR | -29 |  | 0 | 5 | 20 | 25 | mostly cloudy | partly cloudy |
| 17. ESTEVAN | -11 | +3 | 20 | 90 | 0 | 10 | mostly cloudy | overcast, light snow |
| 18. FENTON | -21 | -19 | 0 | 10 | 5 | 15 | mostly clear | mostly clear |
| 19. FIFE LAKE | -20 | -15 | 3 | 10 | 0 | 10 |  | mostly clear |
| 20. FORT QU'APPELLE | -22 | -18 | 2 | 5 | 15 |  |  |  |
| 21. FORT WALSH | -8 | -15 | 0 | 20 | 0 | 30 | mostly cloudy | mostly cloudy, light snow |
| 22. GARDINER DAM | -25 | -23 | 20 | 40 | 10 | 20 | mostly cloudy | mostly cloudy |
| 23. GOOD SPIRIT LAKE | -35 | -24 | 5 | 12 | 15 | 28 | clear | mostly clear |
| 24. GOVENLOCK | -20 | -8 | 0 | 20 | 2 | 10 | partly cloudy | partly cloudy |
| 15. GRAND CENTRE-PIERCELAND | -20 | -19 | 14 | 16 | 25 | 40 | overcast, light snow | partly cloudy |
| 26. GRASSLANDS NATIONAL PARK | -10 | -5 | 10 | 70 | 2 | 10 | mostly clear | partly cloudy |
| 27. HUDSON BAY | -15 | -20 | 25 | 30 | 35 | 45 | mostly clear | partly cloudy |
| 28. HUMBOLDT | -20 | -16 | 5 | 10 | 3 | 8 | overcast, light snow | overcast, light snow |
| 29. INDIAN HEAD | -30 | -25 | 10 | 15 | 25 | 30 |  | clear |
| 30. KAMSACK | -42 | -30 | 20 | 30 | 60 | 90 | mostly clear | mostly clear |
| 31. KELVINGTON | -17 | -15 | 0 | 35 | 50 | 60 | partly cloudy | mostly cloudy |
| 32. KENASTON | -24 | -18 | 12 | 20 | 15 | 20 | overcast, mod. snow | overcast, light snow |
| 33. KINDERSLEY | -31 | -20 | 10 | 15 | 10 | 30 |  | mostly clear |
| 34. KINLOCH | -18 | -15 | 10 | 20 | 26 | 36 | mostly clear | mostly cloudy |
| 35. KUTAWAGAN LAKE | -24 | -17 | 10 | 20 | 20 | 25 | mostly clear | mostly clear |
| 36. LARONGE | -23 | -15 | 7 | 12 | 30 | 50 | partly cloudy | mostly cloudy |
| 37. LAST MOUNTAIN LAKE N.W.A. | -28 | -20 | 20 | 70 | 5 | 20 | mostly cloudy | overcast, mod. snow |
| 38. LEADER | -40 | 0 | 0 | 5 | 5 | 30 | mostly clear | clear |
| 39. LIVELONG | -25 | -19 | 10 | 15 | 25 | 30 | mostly clear | clear |
| 40. LOON LAKE | -40 | -27 | 0 |  | 27 |  | clear | mostly clear |
| 41.LOVE-TORCH RIVER | -40 | -33 | 0 | 5 | 30 | 45 |  |  |
| 42. LUSELAND | -34 | -30 | 5 | 10 | 10 | 25 | mostly cloudy | mostly cloudy |
| 43. MACDOWALL | -30 | -25 | 2 | 6 | 12 | 18 | mostly clear | mostly clear |
| 44. MARSDEN | -47 | -23 | 0 | 70 | 10 | 25 |  |  |
| 45. MEADOW LAKE | -33 | -30 | 10 | 40 | 15 | 75 | clear | clear |
| 46. MELFORT | -16 | -40 |  |  |  |  | mostly clear | mostly clear |
| 47. MELVILLE | -30 | -24 | 10 | 20 | 5 | 30 | mostly clear | mostly clear |
| 48. MISSINIPE | -22 | -13 | 0 |  | 25 |  | clear | clear |
| 49. MOOSE JAW | -10 | -9 | 18 |  | 12 | 50 | overcast | overcast |
| 50. MOOSE MOUNTAIN | -26 | -18 | 5 | 15 | 2 | 10 | overcast | mostly cloudy |
| 51. NICOLLE FLATS | -20 | -15 | 0 | 15 | 10 | 20 | overcast | overcast |
| 52. NIPAWIN | -14 | -14 | 0 | 5 | 23 | 61 | clear | mostly clear |
| 53. PIKE LAKE | -22 | -19 | 15 | 17 | 5 | 10 |  |  |
| 54. PORCUPINE PLAIN | -35 | -30 | 0 | 0 | 30 | 35 |  |  |
| 55. PRINCE ALBERT (A) | -32 |  |  |  |  |  |  |  |
| 56. PRINCE ALBERT (B) | -36 | -30 | 5 | 20 | 1 | 10 | mostly clear | mostly clear |
| 57. PRINCE ALBERT NAT. PARK | -31 | -28 | 10 | 25 | 25 | 45 | clear | clear |
| 58. QU'APPELLE VALLEY DAM | -20 | -17 | 15 | 20 | 2 | 12 | mostly cloudy | mostly cloudy, light snow |
| 59. RAYMORE | -24 | -18 | 0 | 10 | 15 | 20 | mostly clear | mostly clear |
| 60. REGINA | -18 | -12 | 15 | 40 | 0 | 10 | moderate blowing snow | moderate snow |
| 61. REGINA BEACH | -20 | -18 | 10 | 15 | 15 | 40 | mostly cloudy | mostly cloudy |
| 62. ROUND LAKE | -25 |  | 10 | 15 | 30 |  | mostly cloudy, mod. snow | mostly cloudy, hvy. snow |
| 63. SASKATOON | -22 | -16 | 24 | 37 | 10 | 13 | overcast, light snow & fog | overcast, light snow |
| 64. SCOTT | -20 | -15 | 5 | 20 | 10 | 30 | ptly. cloudy, lt. snow & fog | mostly cldy., lt.snow & fog |
| 65. SKULL CREEK | -22 | -20 | 5 | 10 | 10 | 15 |  |  |

Table 1. COUNT WEATHER CONDITIONS (continued) (T°C, Wind kmph, Snow cm)

| LOCALITY | Min. T°C | Max. T°C | Min. Wind | Max. Wind | Min. Snow | Max. Snow | Sky A.M. | Sky P.M. |
|---|---|---|---|---|---|---|---|---|
| 66. SNOWDEN | -22 | -21 | 0 | 15 | 2 | 30 | clear | clear |
| 67. SOMME-NEELY LAKE | -20 | -10 | 0 | 5 | 30 | 35 | partly cloudy | partly cloudy |
| 68. SPALDING | -22 | -15 | 0 | 5 | 45 | 60 | partly cloudy | partly cloudy |
| 69. SPINNEY HILL | -21 | -21 | 0 | 20 | 2 | 50 | mostly clear | ptly. cloudy, very lt. snow |
| 70. SPRING VALLEY | -26 | -19 | 10 | 15 | 15 | 18 | mostly cloudy | mostly cloudy |
| 71. SPRUCE HOME | -33 | -25 | 5 | 10 | 25 | 31 | partly cloudy | partly cloudy |
| 72. SQUAW RAPIDS | -20 | -11 | 5 | 15 | 15 | 20 | mostly cloudy | mostly cloudy |
| 73. SWIFT CURRENT | -21 | -15 | 20 | 37 | 2 | 30 | mostly cloudy | mostly cloudy |
| 74. TISDALE | -30 | -25 | 10 | 20 | 15 | 20 | mostly clear | partly cloudy |
| 75. TURTLE LAKE | -35 | 25 | 5 | 10 | 30 | 40 | clear | clear |
| 76. VAL MARIE | -22 | -15 | 5 | 15 | 10 | 15 | clear | mostly clear |
| 77. WEYBURN | -28 | -25 | 0 | 0 | 5 | 7 | mostly clear | partly cloudy |
| 78. WHITE BEAR | -23 | -21 | 5 | 10 | 10 | 30 | overcast, light snow | |
| 79. WHITEWOOD | -32 | -20 | 0 | 15 | 10 | 40 | clear | clear |
| 80. YORKTON | -20 | -18 | 0 | 8 | 15 | 40 | overcast | clear |

*Ferruginous Hawk.* *Wayne Lynch*

Table 2. COUNT COVERAGE (*indicates counts which conform to the North American standard of all day counts covering a 15-mile diameter circle)

| | | | | | | Habitat Covered (%) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COUNT NAME | Km on Foot | Hours on Foot | Km by Vehicle | Hours by Vehicle | Hours at Feeders | Coniferous Woods | Mixed Woods | Deciduous Woods | Aspen Grove/Prairie | Aspen Grove/Farmland | Native Prairie | Seeded Pasture | Cultivated Fields | Farmyard | Urban | Open Water |
| 1. ABERNETHY-KATEPWA L. | | | 85 | 3 | 2 | | | | | 51-75 | | | 6-25 | | 6-25 | |
| 2. ARMIT* | 3 | 3 | 106 | 5 | | <5 | >75 | <5 | | | | | <5 | | | |
| 3. BETHUNE | | | 20 | 3 | 1 | | | | | | | | | | | |
| 4. BIGGAR* | 10 | 5 | 193 | 11.5 | 2 | | | | | 6-25 | | | 6-25 | 6-25 | 6-25 | |
| 5. BIG MUDDY LAKE* | 6 | 2.5 | 283 | 11 | | | | | | | 6-25 | | 51-75 | 6-25 | | |
| 6. BIRCH HILLS | 2 | 1 | 55 | 3.5 | .5 | | <5 | <5 | | 6-25 | | <5 | 51-75 | 6-25 | 6-25 | |
| 7. BROMHEAD* | | | 195 | 7 | | | | | | | | | >75 | | | |
| 8. CABRI | 4 | .5 | 66.7 | 2.5 | .5 | | | | | | 6-25 | 6-25 | 26-50 | 6-25 | <5 | |
| 9. CANDLE LAKE* | 5 | 1.5 | 145 | 5 | .5 | 6-25 | 26-50 | 6-25 | | | | | | | | |
| 10. CLARK'S CROSSING* | 13 | 13.9 | 478 | 17.8 | | | | <5 | <5 | 51-75 | | 6-25 | 6-25 | 6-25 | <5 | 6-25 |
| 11. CRAVEN | 14 | 9 | 304 | 14 | | | | 26-50 | | | <5 | | 26-50 | 6-25 | 6-25 | |
| 12. CROOKED LAKE | 15 | 6 | 70 | 7 | 2 | | | | 26-50 | | 6-25 | | | | | <5 |
| 13. DILKE | 2 | .66 | 93 | 5.33 | 1 | | | | 6-25 | 6-25 | 6-25 | | 6-25 | <5 | <5 | |
| 14. DUVAL | 2 | 1 | 85.5 | 4 | 1 | | | | | 51-75 | | | 26-50 | 6-25 | 6-25 | |
| 15. EDAM | | | 10 | 1 | 4 | | | | | | | | | | | |
| 16. ENDEAVOUR | 3 | 3 | 30 | 2.5 | | | | 26-50 | | | | | | 26-50 | <5 | |
| 17. ESTEVAN* | 6 | 3 | 80 | 3.5 | | | | | | | | 26-50 | 26-50 | 6-25 | 6-25 | 26-50 |
| 18. FENTON | | | 141 | 2.75 | .5 | | | | 6-25 | 6-25 | | 6-25 | 26-50 | <5 | | |
| 19. FIFE LAKE | 1 | .5 | 150 | 3 | | | | | | | <5 | | >75 | | | <5 |
| 20. FORT OU'APPELLE | 1 | .5 | 100 | 7 | 5 | | | | 6-25 | 6-25 | | | | 6-25 | 6-25 | 6-25 |
| 21. FORT WALSH* | 74 | 30 | 177 | 11 | | | 26-50 | | | | <5 | 6-25 | 6-25 | | | 26-50 |
| 22. GARDINER DAM* | 19 | 10 | 298 | 14.5 | | | | 6-25 | <5 | | | | 26-50 | 26-50 | <5 | 6-25 |
| 23. GOOD SPIRIT LAKE* | 3 | 1 | 105 | 5 | 3 | <5 | <5 | 6-25 | 6-25 | 51-75 | <5 | 6-25 | 26-50 | 6-25 | <5 | |
| 24. GOVENLOCK* | 16 | 8 | 320 | 13 | | | | | | | 51-75 | | 26-50 | 6-25 | | |
| 25. GRD. CTR-PIERCELAND | 2.5 | 1.5 | 121 | 4 | 1 | <5 | 26-50 | 6-25 | | | | | 6-25 | 6-25 | 6-25 | |
| 26. GRASSLANDS N.P.* | 3 | 2 | 200 | 5 | | | | | | | 51-75 | | 6-25 | 6-25 | | |
| 27. HUDSON BAY | | | | | 3 | | 6-25 | 6-25 | | | | | | 51-75 | <5 | |
| 28. HUMBOLDT | 2 | 1 | 82 | 3 | 2 | | | | | 51-75 | | | 51-75 | | 26-50 | |
| 29. INDIAN HEAD | 1 | .4 | 250 | 15 | 10 | | | | | 51-75 | | | 26-50 | 6-25 | 6-25 | |
| 30. KAMSACK | | | | | 18 | | | | | | | | 26-50 | 26-50 | 6-25 | |
| 31. KELVINGTON | | | 60 | 1 | 1 | | | | | <5 | | | 51-75 | 6-25 | | |
| 32. KENASTON | 4 | 1 | 50 | 2 | 5 | | | | | 6-25 | | | 6-25 | 26-50 | <5 | |
| 33. KINDERSLEY | | | 85 | 1.75 | .5 | | | | 26-50 | | | | 51-75 | 6-25 | <5 | |
| 34. KINLOCH | 2 | 1 | 83 | 3 | 10 | <5 | 26-50 | | | 51-75 | | | | <5 | | |
| 35. KUTAWAGAN LAKE* | 1 | 1 | 200 | 4 | | | | | | | 6-25 | | >75 | | | |
| 36. LARONGE | 6 | 1 | 84 | 4.5 | 1 | 6-25 | 51-75 | | | | | | | | 6-25 | <5 |
| 37. LAST MTN. LAKE NWA* | 3 | 2 | 163 | 4 | | | | | | | 6-25 | 6-25 | >75 | 6-25 | | |
| 38. LEADER | 6 | 1.5 | 35 | 1.5 | 1 | | | | | 6-25 | 3 | 6-25 | | 26-50 | | |
| 39. LIVELONG | | | 10 | 2 | 5 | | 6-25 | | | | | | <5 | | >75 | |
| 40. LOON LAKE | 4 | 2 | | | 3 | | 6-25 | 51-75 | | | | | <5 | | | <5 |

Table 2. COUNT COVERAGE (continued) (*indicates counts which conform to the North American standard of all day counts covering a 15-mile diameter circle)

| | | | | | | Habitat Covered (%) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COUNT NAME | Km on Foot | Hours on Foot | Km by Vehicle | Hours by Vehicle | Hours at Feeders | Coniferous Woods | Mixed Woods | Deciduous Woods | Aspen Grove/Prairie | Aspen Grove/Farmland | Native Prairie | Seeded Pasture | Cultivated Fields | Farmyard | Urban | Open Water |
| 41. LOVE-TORCH RIVER | 1 | 3 | 30 | 2 | 18 | | 6-25 | | | | | | 6-25 | 26-50 | 26-50 | |
| 42. LUSELAND | 3 | 1.5 | 82 | 2.5 | 2 | | | | 6-25 | 51-75 | | | 26-50 | 6-25 | 6-25 | |
| 43. MACDOWALL | 4 | 2 | 45 | 2 | 3 | 6-25 | 6-25 | | | 6-25 | | <5 | 6-25 | | | |
| 44. MARSDEN | 6.5 | 3.5 | 90 | 2 | 3 | | | | | | | | 26-50 | 26-50 | 26-50 | |
| 45. MEADOW LAKE | 4 | 3.5 | 110 | 3 | 1 | | 26-50 | 26-50 | | | | | 6-25 | | | |
| 46. MELFORT | 4 | 2 | 28 | 6 | 8 | | | | | | | | 26-50 | 26-50 | 26-50 | |
| 47. MELVILLE | 3 | 3 | 80 | 3 | 10 | <5 | <5 | <5 | <5 | | <5 | <5 | 6-25 | >75 | <5 | |
| 48. MISSINIPE | | | | | 7 | | | | | | | | | | | |
| 49. MOOSE JAW | 5 | 3 | 5 | 1 | 2 | | | | | | | | 6-25 | | 6-25 | 51-75 |
| 50. MOOSE MOUNTAIN* | 6 | 2 | 166 | 3 | | | | 26-50 | | 51-75 | | | | <5 | 6-25 | |
| 51. NICOLLE FLATS | 3 | 2 | 80 | 3 | | | | 6-25 | <5 | | <5 | <5 | 26-50 | <5 | <5 | |
| 52. NIPAWIN | .5 | .5 | 10 | 1.5 | 6 | | 6-25 | | | | | | | | 51-75 | |
| 53. PIKE LAKE | 18.5 | 7 | 356 | 14.25 | 3 | | <5 | | | 4 | | | 6-25 | | | <5 |
| 54. PORCUPINE PLAIN | 1 | .5 | 60 | 1 | 3 | | 6-25 | | | | | | | 26-50 | 26-50 | |
| 55. PRINCE ALBERT (A) | | | | | 2 | | | | | | | | | | | |
| 56. PRINCE ALBERT (B) | 4 | 1 | 174.5 | 6.75 | 10 | <5 | | <5 | | <5 | | | | | >75 | <5 |
| 57. PRINCE ALBERT N.P.* | 13.5 | 8 | 45 | 2.5 | 5 | 6-25 | 26-50 | 6-25 | | | | | | | 6-25 | <5 |
| 58. QU'APPELLE VAL. DAM* | 2 | 2.1 | 237 | 6.3 | | | | 26-50 | 6-25 | 51-75 | | 6-25 | 6-25 | 6-25 | 6-25 | <5 |
| 59. RAYMORE* | 216 | 8 | 5 | 3 | 2 | | | | | 51-75 | | | 26-50 | 6-25 | <5 | |
| 60. REGINA* | 29 | 19.5 | 292 | 30.5 | | | | | | | | | | | | |
| 61. REGINA BEACH | 1 | 1.5 | 65 | 3 | | | | | | 6-25 | | <5 | 26-50 | | <5 | <5 |
| 62. ROUND LAKE | | | 35 | 1 | 2 | | | | 26-50 | | | | | | | 6-25 |
| 63. SASKATOON* | 75.4 | 40 | 912.3 | 50.25 | 38 | | | | | | | | | | | |
| 64. SCOTT* | 6 | 3 | 155 | 5.5 | | | | | | | | | 26-50 | 26-50 | 6-25 | |
| 65. SKULL CREEK | 16 | 6 | 130 | 8 | 10 | | | 26-50 | | 6-25 | 6-25 | | 26-50 | 26-50 | | |
| 66. SNOWDEN | 2 | 1 | 102 | 4.5 | 2.5 | | 6-25 | | | | | | 26-50 | 26-50 | 6-25 | |
| 67. SOMME-NEELY LAKE | 1 | .5 | 60 | 1 | 2 | | | | | | | | | >75 | | |
| 68. SPALDING | 8 | 3 | 50 | 3 | 2 | | 26-50 | | | | | | | 6-25 | 26-50 | |
| 69. SPINNEY HILL* | 1 | .45 | 114 | 4 | | <5 | | 6-25 | | 51-75 | | | 6-25 | <5 | <5 | |
| 70. SPRING VALLEY | 3 | 1.75 | 104 | 1.5 | 1 | | | | | | 6-25 | 6-25 | 6-25 | 6-25 | | |
| 71. SPRUCE HOME | | | 10 | 1 | 3 | | 51-75 | | | | | | 26-50 | | | |
| 72. SQUAW RAPIDS* | 15 | 8 | 90 | 14 | | 6-25 | 26-50 | 6-25 | | | | | <5 | <5 | | <5 |
| 73. SWIFT CURRENT | 4 | 1.5 | 189 | 9.5 | 29.5 | | | | | | 6-25 | | 51-75 | 6-25 | <5 | <5 |
| 74. TISDALE | | 20 | 1 | | | | | | | 6-25 | | | | | | |
| 75. TURTLE LAKE | | | 30 | 3 | 1 | 6-25 | | | | | | | | | | |
| 76. VAL MARIE | 3 | 1 | 92.7 | 4 | | | | | | | 51-75 | | 6-25 | | <5 | |
| 77. WEYBURN* | 10.4 | 2.5 | 287 | 14.25 | 1.5 | 6-25 | 6-25 | 6-25 | 6-25 | 51-75 | 6-25 | <5 | 26-50 | <5 | 6-25 | <5 |
| 78. WHITE BEAR | 8 | 2.5 | | | .5 | | | | | | 3 | | 26-50 | 6-25 | | |
| 79. WHITEWOOD | .5 | .75 | 241 | 7 | .75 | | | | | 4 | | | 6-25 | 6-25 | 6-25 | |
| 80. YORKTON | 20 | 5 | 150 | 4 | 1 | | | 6-25 | | <5 | | | | <5 | 51-75 | <5 |

## Table 3-1. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES
(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 1. ABERNETHY-KAT. L. 19 Dec. 1992 | 2. ARMIT 24 Dec. 1992 | 3. BETHUNE 03 Jan. 1993 | 4. BIGGAR 30 Dec. 1992 | 5. BIG MUDDY LAKE 03 Jan. 1993 | 6. BIRCH HILLS 01 Jan. 1993 | 7. BROMHEAD 02 Jan. 1993 | 8. CABRI 25 Dec. 1992 | 9. CANDLE LAKE 03 Jan. 1993 | 10. CLARK'S CROSSING 19 Dec. 1992 | 11. CRAVEN 19 Dec. 1992 |
| CANADA GOOSE | | | | | | | | | | | |
| MALLARD | | | | | | | | | | | |
| COMMON GOLDENEYE | | | | | | | | | | 1 | |
| BALD EAGLE | | | | | | | | | | | |
| NORTHERN GOSHAWK | | 2 | | | | | | | 1 | 1 | |
| GOLDEN EAGLE | | | + | + | 6 | | 1 | | | | |
| MERLIN | | | | | | | | | | | 1 |
| GYRFALCON | | | | | | | | | | 1 | |
| PRAIRIE FALCON | | | | | 2 | | | | | | |
| GRAY PARTRIDGE | + | | 16 | 51 | 17 | | 2 | 22 | | 50 | + |
| RING-NECKED PHEASANT | + | | | | 60 | | 13 | 3 | | | |
| RUFFED GROUSE | | 4 | | | | | | | 1 | | 1 |
| SHARP-TAILED GROUSE | 42 | 17 | | 40 | 4 | | 16 | 12 | | 18 | 2 |
| ROCK DOVE | 2 | | 6 | 218 | 9 | 100 | 5 | 83 | | 186 | 16 |
| GREAT HORNED OWL | | | | 2 | 5 | | 4 | 1 | | 1 | |
| SNOWY OWL | + | | 1 | | 1 | 1 | | 2 | | 4 | |
| DOWNY WOODPECKER | + | 2 | | 3 | | 1 | | | 6 | | 4 |
| HAIRY WOODPECKER | 1 | 1 | | 2 | | | | | 4 | 2 | 4 |
| NORTHERN FLICKER | | | | | | | | | | | |
| PILEATED WOODPECKER | | 1 | | | | | | | 1 | | |
| HORNED LARK | | | + | 24 | 383 | 2 | 1962 | 8 | | 1 | 9 |
| GRAY JAY | | 7 | | | | | | | 16 | | |
| BLUE JAY | | 4 | | 3 | | 2 | | | 5 | | 1 |
| BLACK-BILLED MAGPIE | 4 | 14 | 8 | 125 | 70 | 21 | 5 | 6 | 11 | 201 | 75 |
| COMMON RAVEN | + | 21 | | 4 | | 9 | | | 92 | | |
| BLACK-CAPPED CHICKADEE | 4 | 18 | + | 25 | 4 | 23 | | | 63 | 31 | 43 |
| BOREAL CHICKADEE | | 1 | | | | | | | 23 | | |
| RED-BREASTED NUTHATCH | | | | | | | | | 5 | | |
| WHITE-BREASTED NUTHATCH | | | | 1 | | | | | 3 | | 5 |
| GOLDEN-CROWNED KINGLET | 1 | | | | | | | | | | |
| AMERICAN ROBIN | | | | | | | | + | | | 2 |
| BOHEMIAN WAXWING | + | | | + | 10 | 80 | | | | 49 | 15 |
| CEDAR WAXWING | | | | | | | | | | 6 | |
| NORTHERN SHRIKE | | | | | 1 | | | | 1 | | |
| EUROPEAN STARLING | | | | 9 | 13 | 1 | | | | 12 | |
| DARK-EYED JUNCO | | | | 1 | | | | | | | |
| LAPLAND LONGSPUR | | | | | 5 | | 263 | | | | |
| SNOW BUNTING | 40 | 342 | 20 | 309 | 618 | 95 | 335 | 230 | | 886 | 207 |
| RUSTY BLACKBIRD | | | | | 2 | | | | | | |
| PINE GROSBEAK | | 4 | | | | 2 | | | 7 | | |
| COMMON REDPOLL | | 160 | | 18 | 17 | | | | | 53 | 7 |
| HOARY REDPOLL | | | | 5 | | | | | | | |
| PINE SISKIN | | | | | | | | | | | |
| EVENING GROSBEAK | | | | | | 33 | | | 37 | | |
| HOUSE SPARROW | 40 | | 30 | 913 | 222 | 49 | 14 | 60 | | 1276 | 123 |
| NO. INDIV. TABLES 3 & 4 | 0 | 6 | 0 | 1 | 10 | 0 | 0 | 1 | 5 | 0 | 0 |
| NO. SPECIES COUNT DAY | 8 | 19 | 6 | 19 | 21 | 14 | 11 | 10 | 18 | 18 | 16 |
| NO. SPECIES COUNT PERIOD | 14 | 19 | 9 | 21 | 21 | 14 | 11 | 11 | 18 | 18 | 17 |
| NO. SPECIES TABLES 3 & 4 | 0 | 4 | 0 | 1 | 3 | 0 | 0 | 1 | 2 | 0 | 0 |
| NO. INDIV. COUNT DAY | 134 | 604 | 81 | 1754 | 1459 | 419 | 2620 | 428 | 281 | 2779 | 515 |

Table 3-2. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES
(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 12. CROOKED LAKE 03 Jan. 1993 | 13. DILKE 28 Dec. 1992 | 14. DUVAL 29 Dec. 1992 | 15. EDAM 26 Dec. 1992 | 16. ENDEAVOUR 25 Dec. 1992 | 17. ESTEVAN 24 Dec. 1992 | 18. FENTON 02 Jan. 1993 | 19. FIFE LAKE 03 Jan. 1993 | 20. FORT QU'APPELLE 21 Dec. 1992 | 21. FORT WALSH 20 Dec. 1992 | 22. GARDINER DAM 22 Dec. 1992 |
| CANADA GOOSE | | | | + | | 188 | | | 1 | | 1 |
| MALLARD | 18 | | | | | 1988 | | 2500 | 72 | 5 | 3170 |
| COMMON GOLDENEYE | | | | | | 58 | | 3 | 13 | | 20 |
| BALD EAGLE | 1 | | | | | | | | 1 | 3 | 9 |
| NORTHERN GOSHAWK | | + | | | + | | | | | 1 | |
| GOLDEN EAGLE | | + | | | | + | | 1 | + | 1 | 4 |
| MERLIN | | | | | | | | 1 | | | + |
| GYRFALCON | | | 1 | | | | | 1 | | | |
| PRAIRIE FALCON | | | | | | | | 1 | | | |
| GRAY PARTRIDGE | | 68 | + | | | | | 15 | | 17 | 25 |
| RING-NECKED PHEASANT | | | | | | 1 | | 4 | + | 2 | |
| RUFFED GROUSE | | | | | 1 | | | | + | | |
| SHARP-TAILED GROUSE | | + | 4 | | | | | 1 | + | 3 | 29 |
| ROCK DOVE | | 8 | 11 | | | 76 | 30 | | 6 | 5 | 35 |
| GREAT HORNED OWL | 1 | | | + | | 1 | | | + | 2 | 4 |
| SNOWY OWL | | | 1 | 1 | | | | 1 | + | 1 | 3 |
| DOWNY WOODPECKER | 7 | + | 1 | 2 | | 1 | 1 | | 4 | 5 | 1 |
| HAIRY WOODPECKER | 4 | | | 2 | 1 | | 3 | | 8 | 6 | 2 |
| NORTHERN FLICKER | | | | | | | | | | | |
| PILEATED WOODPECKER | | | | + | | | | | | | |
| HORNED LARK | | 6 | 25 | | | 95 | | 300 | | 1 | 26 |
| GRAY JAY | | | | | | | | | | | |
| BLUE JAY | | | 2 | | | | 4 | | 10 | | 1 |
| BLACK-BILLED MAGPIE | 8 | 20 | 16 | 4 | 5 | 3 | 63 | 11 | 14 | 131 | 87 |
| COMMON RAVEN | | | | + | 24 | | 11 | | + | | |
| BLACK-CAPPED CHICKADEE | 49 | + | 9 | 8 | 3 | 8 | 12 | | 72 | 109 | 13 |
| BOREAL CHICKADEE | | | | | | | | | | | |
| RED-BREASTED NUTHATCH | | | | | | | | | | 18 | |
| WHITE-BREASTED NUTHATCH | 8 | | | | | 3 | | | 8 | | |
| GOLDEN-CROWNED KINGLET | | | | | | | | | | 9 | |
| AMERICAN ROBIN | | | | | | | | | | 1 | |
| BOHEMIAN WAXWING | | | 11 | | | 5 | | | 3 | | 61 |
| CEDAR WAXWING | | | | | | | | | 6 | | |
| NORTHERN SHRIKE | | | 1 | | | | | + | 1 | 3 | 1 |
| EUROPEAN STARLING | 1 | | | | | 1 | | | | | 8 |
| DARK-EYED JUNCO | | | | 1 | | | | | 1 | 3 | |
| LAPLAND LONGSPUR | | | | | | 1 | | | | | |
| SNOW BUNTING | 150 | + | 374 | | 150 | 275 | 174 | | 10 | 344 | 194 |
| RUSTY BLACKBIRD | | | | | | | | | | 11 | |
| PINE GROSBEAK | | | | | | | + | | | | 8 |
| COMMON REDPOLL | | 12 | 2 | | | | | | + | 35 | |
| HOARY REDPOLL | | | | | | | | + | | | |
| PINE SISKIN | | | | | | 1 | | | + | | |
| EVENING GROSBEAK | | | | | 5 | | 18 | | | | |
| HOUSE SPARROW | 21 | 62 | 232 | 10 | 2 | 75 | | 60 | 124 | 135 | 536 |
| NO. INDIV. TABLES 3 & 4 | 0 | 0 | 0 | 0 | 1 | 28 | 0 | 0 | 3 | 86 | 258 |
| NO. SPECIES COUNT DAY | 11 | 6 | 14 | 7 | 9 | 21 | 9 | 13 | 20 | 28 | 25 |
| NO. SPECIES COUNT PERIOD | 13 | 12 | 15 | 11 | 10 | 22 | 10 | 15 | 32 | 28 | 26 |
| NO. SPECIES TABLES 3 & 4 | 2 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 5 | 5 | 3 |
| NO. INDIV. COUNT DAY | 268 | 176 | 690 | 28 | 192 | 2808 | 316 | 2899 | 357 | 937 | 4496 |

Table 3-3. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES
(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 23. GOOD SPIRIT LAKE 01 Jan. 1993 | 24. GOVENLOCK 21 Dec. 1992 | 25. G. CTR.-PIERCELAND 26 Dec. 1992 | 26. GRASSLANDS N. P. 19 Dec. 1992 | 27. HUDSON BAY 02 Jan. 1993 | 28. HUMBOLDT 26 Dec. 1992 | 29. INDIAN HEAD 30 Dec. 1992 | 30. KAMSACK 26 Dec. 1992 | 31. KELVINGTON 02 Jan. 1993 | 32. KENASTON 26 Dec. 1992 | 33. KINDERSLEY 03 Jan. 1993 |
| CANADA GOOSE | | | | | | | | | | | |
| MALLARD | | | | | | | | | | | |
| COMMON GOLDENEYE | | | | | | | | | | | |
| BALD EAGLE | | | | 1 | | | | | | | |
| NORTHERN GOSHAWK | | | | | | | | | | | |
| GOLDEN EAGLE | | 4 | | 6 | | | | | | | |
| MERLIN | | | | | | | | | + | | |
| GYRFALCON | | | | | | | | | | + | |
| PRAIRIE FALCON | | 5 | | | | | | | | | |
| GRAY PARTRIDGE | | 27 | | 1 | | | 10 | 10 | | 18 | |
| RING-NECKED PHEASANT | | 2 | | 9 | | | | | | | |
| RUFFED GROUSE | + | | | | + | 1 | | | | | |
| SHARP-TAILED GROUSE | 2 | | | 1 | + | | 8 | 18 | | | |
| ROCK DOVE | | 4 | | | | 112 | 2 | | | 30 | |
| GREAT HORNED OWL | | 5 | | 2 | | | 2 | | | + | |
| SNOWY OWL | | 7 | | | | | 1 | 6 | | 1 | 5 |
| DOWNY WOODPECKER | 8 | 1 | 3 | | 2 | 2 | 3 | 12 | 4 | | |
| HAIRY WOODPECKER | 9 | | 7 | | 3 | | 2 | 13 | 5 | 1 | |
| NORTHERN FLICKER | | | | | | | | | | | |
| PILEATED WOODPECKER | 1 | | | | | | | 2 | | | |
| HORNED LARK | | 944 | | 3 | | | 10 | | | | |
| GRAY JAY | | | 2 | | 2 | | | 17 | | | |
| BLUE JAY | 3 | | 12 | | 18 | 1 | 8 | 38 | 4 | | |
| BLACK-BILLED MAGPIE | 24 | 17 | 17 | 29 | 6 | 15 | 39 | 16 | 8 | | 2 |
| COMMON RAVEN | 6 | | 101 | | 23 | | | 38 | 2 | | |
| BLACK-CAPPED CHICKADEE | 43 | 2 | 41 | | 42 | 32 | 45 | 140 | 20 | 3 | |
| BOREAL CHICKADEE | | | | | | | | 4 | | | |
| RED-BREASTED NUTHATCH | | | | | | 2 | 3 | | | | |
| WHITE-BREASTED NUTHATCH | 2 | | 3 | | 5 | | 5 | 15 | 1 | | |
| GOLDEN-CROWNED KINGLET | | | | | | | | | | | |
| AMERICAN ROBIN | | | | | | | | | | | |
| BOHEMIAN WAXWING | 17 | | | | | 450 | | 90 | | | 39 |
| CEDAR WAXWING | | | | | | | | | | | |
| NORTHERN SHRIKE | + | 4 | | 2 | | | 1 | | | | |
| EUROPEAN STARLING | 7 | 6 | 3 | 2 | | | | | | | |
| DARK-EYED JUNCO | | | + | 1 | | | | 6 | | | |
| LAPLAND LONGSPUR | | 13 | | | | | | | | | |
| SNOW BUNTING | + | 1 | 80 | 1 | 249 | 45 | 330 | 70 | 500 | | |
| RUSTY BLACKBIRD | | | | | | | | | | | |
| PINE GROSBEAK | 38 | | 21 | | 61 | | | 17 | 3 | | |
| COMMON REDPOLL | | 3 | 87 | | 21 | | | 10 | | | |
| HOARY REDPOLL | 20 | | | | 3 | | | | | | |
| PINE SISKIN | | | | | | | | 10 | | | |
| EVENING GROSBEAK | 2 | | 1 | | 106 | | | 564 | 28 | | |
| HOUSE SPARROW | 89 | 240 | 15 | 3 | 5 | 50 | 160 | | 5 | 26 | 40 |
| NO. INDIV. TABLES 3 & 4 | 0 | 9 | 0 | 19 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| NO. SPECIES COUNT DAY | 15 | 21 | 14 | 16 | 14 | 10 | 16 | 21 | 11 | 6 | 4 |
| NO. SPECIES COUNT PERIOD | 18 | 21 | 15 | 16 | 17 | 13 | 16 | 21 | 12 | 8 | 4 |
| NO. SPECIES TABLES 3 & 4 | 0 | 4 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| NO. INDIV. COUNT DAY | 271 | 1294 | 393 | 80 | 546 | 710 | 629 | 1097 | 580 | 79 | 86 |

## Table 3-4. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES
(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 34. KINLOCH 03 Jan. 1993 | 35. KUTAWAGAN LAKE 02 Jan. 1993 | 36. LARONGE 02 Jan. 1993 | 37. LAST MTN. LAKE 26 Dec. 1992 | 38. LEADER 31 Dec. 1992 | 39. LIVELONG 02 Jan. 1993 | 40. LOON LAKE 31 Dec. 1992 | 41. LOVE-TORCH RIVER 28 Dec. 1992 | 42. LUSELAND 29 Dec. 1992 | 43. MACDOWALL 01 Jan. 1993 | 44. MARSDEN 28 Dec. 1992 |
| CANADA GOOSE | | | | | | | | | | | |
| MALLARD | | | | | | | | | | | |
| COMMON GOLDENEYE | | | | | | | | | | | |
| BALD EAGLE | | | | | 1 | | | | | | |
| NORTHERN GOSHAWK | | | | | | | | 1 | | | |
| GOLDEN EAGLE | | | | | 1 | | | | | | |
| MERLIN | | | | | | | | | | | |
| GYRFALCON | | | | | | | | | | | |
| PRAIRIE FALCON | | | | | | | | | | | |
| GRAY PARTRIDGE | | | | 6 | | | | | 22 | | 33 |
| RING-NECKED PHEASANT | | | | | 21 | | | | | | |
| RUFFED GROUSE | + | | | | | | 2 | | | | |
| SHARP-TAILED GROUSE | | | | 35 | | | | | + | | 9 |
| ROCK DOVE | 5 | 6 | | 127 | 20 | 50 | | 10 | 34 | | 25 |
| GREAT HORNED OWL | | 1 | | 4 | 1 | | | 1 | + | | 5 |
| SNOWY OWL | | 2 | | 1 | 1 | | | | 1 | | 1 |
| DOWNY WOODPECKER | | | + | | | 5 | | 2 | 2 | 2 | 11 |
| HAIRY WOODPECKER | 3 | | 5 | | | 7 | 3 | 5 | 1 | 2 | 9 |
| NORTHERN FLICKER | | | | | | | | | | | |
| PILEATED WOODPECKER | | | | | | | | | | 1 | |
| HORNED LARK | | | | 1 | | | | | | | |
| GRAY JAY | 2 | | 5 | | | | 2 | 4 | | | |
| BLUE JAY | 2 | 1 | 1 | | | 18 | 3 | 13 | 3 | 6 | 8 |
| BLACK-BILLED MAGPIE | 1 | 39 | 2 | 61 | 28 | 5 | | + | 13 | 50 | 17 |
| COMMON RAVEN | 4 | | 123 | | | 4 | 3 | 17 | | 25 | |
| BLACK-CAPPED CHICKADEE | 16 | 3 | 17 | | 1 | 28 | 9 | 51 | 6 | 20 | 107 |
| BOREAL CHICKADEE | | | 3 | | | | | 2 | | | |
| RED-BREASTED NUTHATCH | | | | | | | | | | + | |
| WHITE-BREASTED NUTHATCH | | | | | | | | 4 | | | 3 |
| GOLDEN-CROWNED KINGLET | | | | | | | | | | | |
| AMERICAN ROBIN | | | | | | | | | | | |
| BOHEMIAN WAXWING | | | | | 60 | 6 | | | 19 | 20 | 20 |
| CEDAR WAXWING | | | | | | | | | | | |
| NORTHERN SHRIKE | | | | | | | | | | | |
| EUROPEAN STARLING | | | | 5 | | | | | | | |
| DARK-EYED JUNCO | | | | | | | | | | | |
| LAPLAND LONGSPUR | | | | | | | | | | | |
| SNOW BUNTING | + | 130 | | 226 | | 50 | | + | + | 1 | 120 |
| RUSTY BLACKBIRD | | | | 1 | | | | | | | |
| PINE GROSBEAK | 35 | | 15 | | | 40 | 1 | 27 | | 4 | 3 |
| COMMON REDPOLL | 23 | | 4 | | | | | + | | | 8 |
| HOARY REDPOLL | | | | | | | | | | | |
| PINE SISKIN | | | | | | | | | | | |
| EVENING GROSBEAK | 10 | | 14 | | | 20 | | 277 | | 25 | |
| HOUSE SPARROW | 14 | 370 | | 385 | 6 | 40 | | 3 | 171 | 1 | 386 |
| NO. INDIV. TABLES 3 & 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 5 |
| NO. SPECIES COUNT DAY | 11 | 8 | 10 | 11 | 11 | 12 | 7 | 14 | 10 | 13 | 17 |
| NO. SPECIES COUNT PERIOD | 13 | 8 | 11 | 11 | 11 | 12 | 7 | 17 | 13 | 14 | 17 |
| NO. SPECIES TABLES 3 & 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| NO. INDIV. COUNT DAY | 115 | 552 | 189 | 852 | 141 | 273 | 23 | 417 | 272 | 158 | 770 |

## Table 3-5. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES
(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 45. MEADOW LAKE 27 Dec. 1992 | 46. MELFORT 19 Dec. 1992 | 47. MELVILLE 25 Dec. 1992 | 48. MISSINIPE 03 Jan. 1993 | 49. MOOSE JAW 26 Dec. 1992 | 50. MOOSE MOUNTAIN 17 Dec. 1992 | 51. NICOLLE FLATS 03 Jan. 1993 | 52. NIPAWIN 03 Jan. 1993 | 53. PIKE LAKE 02 Jan. 1993 | 54. PORCUPINE PLAIN 28 Dec. 1992 | 55. PRINCE ALBERT (A) 22 Dec. 1992 |
| CANADA GOOSE | | | | | | | | | | | |
| MALLARD | | | | | | | | | | | |
| COMMON GOLDENEYE | | | | | | | | | | | |
| BALD EAGLE | | | + | | | 1 | | | | | |
| NORTHERN GOSHAWK | | | | | | | | | 1 | | |
| GOLDEN EAGLE | | | | | | | | | | | |
| MERLIN | | | | | 1 | | | | 1 | | |
| GYRFALCON | | | | | | | | | | | |
| PRAIRIE FALCON | | | | | | | | | | | |
| GRAY PARTRIDGE | | | | | 7 | | 27 | | | | |
| RING-NECKED PHEASANT | | | | | + | 2 | | | | | |
| RUFFED GROUSE | | | | | | | | | 4 | + | |
| SHARP-TAILED GROUSE | | | 20 | | | 5 | | | 128 | | |
| ROCK DOVE | | | | | 60 | 2 | | | 3 | 8 | |
| GREAT HORNED OWL | | | | | 1 | 1 | | | 2 | | |
| SNOWY OWL | | | | | | | 2 | | | | |
| DOWNY WOODPECKER | 3 | | 1 | | 3 | 9 | | 2 | 10 | + | 2 |
| HAIRY WOODPECKER | 3 | | 1 | 1 | 2 | 10 | 1 | 1 | 14 | 2 | 2 |
| NORTHERN FLICKER | | | | | 2 | | | | | | |
| PILEATED WOODPECKER | | | | | | 1 | | | | | 1 |
| HORNED LARK | | | | | | | 51 | | | | |
| GRAY JAY | 5 | | | 6 | | | | 2 | | 3 | |
| BLUE JAY | 3 | 5 | 1 | 4 | | 14 | | 6 | 20 | 9 | 1 |
| BLACK-BILLED MAGPIE | 5 | 8 | 1 | | 10 | 32 | 66 | 1 | 111 | 5 | 4 |
| COMMON RAVEN | 28 | 5 | 1 | 4 | | 1 | | 41 | 3 | 29 | 2 |
| BLACK-CAPPED CHICKADEE | 20 | 3 | 3 | 6 | 19 | 72 | | 4 | 117 | 28 | 10 |
| BOREAL CHICKADEE | 1 | | | 8 | | | | | | | |
| RED-BREASTED NUTHATCH | | | | | 1 | | | 2 | 2 | | |
| WHITE-BREASTED NUTHATCH | 1 | | | | 9 | 10 | | 2 | 5 | 2 | 2 |
| GOLDEN-CROWNED KINGLET | | | | | | 8 | | | | | |
| AMERICAN ROBIN | | | | | | 1 | | | | | |
| BOHEMIAN WAXWING | | 20 | | | 2 | | | 5 | 159 | | |
| CEDAR WAXWING | 10 | | + | | 5 | 15 | | | | | |
| NORTHERN SHRIKE | | | | | | 1 | | | 1 | | |
| EUROPEAN STARLING | | | | | | | | | | | |
| DARK-EYED JUNCO | | | | 2 | 2 | | | 4 | | | |
| LAPLAND LONGSPUR | | | | | | | | | | | |
| SNOW BUNTING | 20 | | 30 | | | | | | 1546 | 25 | |
| RUSTY BLACKBIRD | | | | | | | | | | + | |
| PINE GROSBEAK | 42 | | | + | + | | | 1 | 6 | 16 | 2 |
| COMMON REDPOLL | | | | | + | | | | 118 | 10 | |
| HOARY REDPOLL | | | | | | | | | | 20 | |
| PINE SISKIN | | | | | | | | | 1 | 5 | |
| EVENING GROSBEAK | 43 | 4 | | 16 | | | | 51 | 5 | 45 | 12 |
| HOUSE SPARROW | 41 | 20 | 30 | | 235 | 122 | 15 | | 248 | 30 | |
| NO. INDIV. TABLES 3 & 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 7 | 0 | 0 |
| NO. SPECIES COUNT DAY | 14 | 7 | 9 | 8 | 15 | 19 | 6 | 13 | 25 | 15 | 10 |
| NO. SPECIES COUNT PERIOD | 14 | 7 | 11 | 9 | 18 | 19 | 6 | 13 | 25 | 18 | 10 |
| NO. SPECIES TABLES 3 & 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 |
| NO. INDIV. COUNT DAY | 225 | 65 | 88 | 47 | 359 | 308 | 162 | 122 | 2512 | 237 | 38 |

## Table 3-6. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES

(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 56. PRINCE ALBERT (B) 20 Dec. 1992 | 57. PRINCE ALBERT N.P. 20 Dec. 1992 | 58. QU'APPELLE VAL. D. 20 Dec. 1992 | 59. RAYMORE 25 Dec. 1992 | 60. REGINA 26 Dec. 1992 | 61. REGINA BEACH 03 Jan. 1993 | 62. ROUND LAKE 26 Dec. 1992 | 63. SASKATOON 26 Dec. 1992 | 64. SCOTT 03 Jan. 1993 | 65. SKULL CREEK 26 Dec. 1992 | 66. SNOWDEN 22 Dec. 1992 |
| CANADA GOOSE | | | | | 240 | | 2 | | | | |
| MALLARD | | | 34 | | 84 | | 3 | 1 | | | |
| COMMON GOLDENEYE | | | 5 | | | | | 76 | | | |
| BALD EAGLE | | | | | | | 1 | | | 2 | |
| NORTHERN GOSHAWK | | | 1 | + | | | | 2 | | 1 | |
| GOLDEN EAGLE | | | | | | | | | | 1 | |
| MERLIN | + | | | | 1 | | | 2 | | | |
| GYRFALCON | | | | | | | | | | | |
| PRAIRIE FALCON | | | | | | | | | | 2 | |
| GRAY PARTRIDGE | | | 30 | 7 | 6 | 18 | | 22 | 23 | 17 | 3 |
| RING-NECKED PHEASANT | | | | | 1 | | | | | 4 | |
| RUFFED GROUSE | | 1 | | 1 | | | 1 | | | | + |
| SHARP-TAILED GROUSE | | | 121 | 62 | 2 | 2 | | 64 | 6 | 9 | |
| ROCK DOVE | 425 | | 5 | 21 | 456 | 6 | | 1016 | 46 | 2 | |
| GREAT HORNED OWL | | | 1 | 3 | 9 | | 1 | 4 | 1 | 6 | |
| SNOWY OWL | | | 3 | + | 4 | 1 | | 1 | 3 | 3 | |
| DOWNY WOODPECKER | 4 | 1 | 1 | 2 | 5 | 1 | 7 | 29 | 1 | 21 | 2 |
| HAIRY WOODPECKER | 5 | 1 | 1 | 3 | 3 | | 4 | 15 | | 8 | 4 |
| NORTHERN FLICKER | | | | | 5 | | 1 | 3 | | | |
| PILEATED WOODPECKER | | 1 | | | | | | | | | |
| HORNED LARK | | | 14 | 7 | | | | 14 | | 74 | |
| GRAY JAY | 3 | 5 | | | | | | | | | 9 |
| BLUE JAY | 8 | | | 1 | | | 4 | 32 | 1 | | 2 |
| BLACK-BILLED MAGPIE | 42 | 6 | 44 | 84 | 60 | 4 | 16 | 376 | 82 | 75 | 17 |
| COMMON RAVEN | 247 | 1 | | + | | 1 | | 1 | | | 94 |
| BLACK-CAPPED CHICKADEE | 24 | 20 | 14 | 17 | 21 | 2 | 40 | 265 | 24 | 130 | 10 |
| BOREAL CHICKADEE | | 4 | | | | | 2 | 1 | | | 7 |
| RED-BREASTED NUTHATCH | | 1 | | + | 1 | 1 | | 9 | | | |
| WHITE-BREASTED NUTHATCH | 2 | 3 | 1 | | 3 | | 4 | 2 | | 2 | 3 |
| GOLDEN-CROWNED KINGLET | | | | + | + | | | 18 | | | |
| AMERICAN ROBIN | 2 | | | + | 2 | | 2 | 3 | | | |
| BOHEMIAN WAXWING | 1385 | | | 14 | 18 | | | 479 | 1 | 294 | |
| CEDAR WAXWING | | | | + | | | | 38 | | | |
| NORTHERN SHRIKE | | | | + | | | 1 | + | 1 | | |
| EUROPEAN STARLING | 16 | | | | | | | 4 | | 6 | |
| DARK-EYED JUNCO | | | | 1 | 4 | | | 1 | | 5 | |
| LAPLAND LONGSPUR | | | | | | | | | | | |
| SNOW BUNTING | 12 | | 984 | 170 | 84 | | | 326 | 498 | 162 | 317 |
| RUSTY BLACKBIRD | | | | | | | | + | | 1 | |
| PINE GROSBEAK | 2 | | | 18 | 26 | | | 3 | | | 10 |
| COMMON REDPOLL | | | | | | | | 98 | | 15 | 33 |
| HOARY REDPOLL | | | | | | | | | | | |
| PINE SISKIN | | | | | 5 | | | | | | + |
| EVENING GROSBEAK | 58 | | | | | | 25 | | | | 101 |
| HOUSE SPARROW | 72 | | 74 | 460 | 1228 | 20 | | 1642 | 345 | 722 | 15 |
| NO. INDIV. TABLES 3 & 4 | 1 | 9 | 15 | 0 | 8 | 0 | 0 | 79 | 0 | 37 | 0 |
| NO. SPECIES COUNT DAY | 17 | 12 | 18 | 16 | 28 | 10 | 16 | 32 | 13 | 27 | 15 |
| NO. SPECIES COUNT PERIOD | 20 | 13 | 18 | 25 | 32 | 10 | 16 | 34 | 13 | 27 | 18 |
| NO. SPECIES TABLES 3 & 4 | 3 | 3 | 2 | 1 | 8 | 0 | 0 | 4 | 0 | 4 | 1 |
| NO. INDIV. COUNT DAY | 2308 | 53 | 1348 | 871 | 2276 | 56 | 114 | 4626 | 1032 | 1599 | 627 |

Table 3-7. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES
(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 67. SOMME-NEELY LAKE 17 Dec. 1992 | 68. SPALDING 03 Jan. 1993 | 69. SPINNEY HILL 02 Jan. 1993 | 70. SPRING VALLEY 25 Dec. 1992 | 71. SPRUCE HOME 02 Jan. 1993 | 72. SQUAW RAPIDS 17 Dec. 1992 | 73. SWIFT CURRENT 02 Jan. 1993 | 74. TISDALE 30 Dec. 1992 | 75. TURTLE LAKE 26 Dec. 1992 | 76. VAL MARIE 03 Jan. 1993 | 77. WEYBURN 19 Dec. 1992 |
| CANADA GOOSE | | | | | | 1 | | | | | |
| MALLARD | | | | | | 4 | | | | | |
| COMMON GOLDENEYE | | | | | | 160 | | | | | |
| BALD EAGLE | | | | | | 5 | | | 6 | | |
| NORTHERN GOSHAWK | | | | | | 4 | | | | | |
| GOLDEN EAGLE | | | | + | | | | | | 1 | + |
| MERLIN | | | | + | | | 1 | | | | + |
| GYRFALCON | | | | + | | | | | | | 2 |
| PRAIRIE FALCON | | | | + | | | | | | | 1 |
| GRAY PARTRIDGE | + | | | 36 | | | 27 | | | | 56 |
| RING-NECKED PHEASANT | | | | | | | + | | | 2 | 1 |
| RUFFED GROUSE | 2 | 1 | | | | 11 | | | 3 | | |
| SHARP-TAILED GROUSE | 24 | | 1 | 41 | | 10 | | | | 5 | 21 |
| ROCK DOVE | 2 | | | 13 | | | 28 | | | 30 | 28 |
| GREAT HORNED OWL | + | | 1 | 2 | | | | | 3 | 2 | 1 |
| SNOWY OWL | | + | | 1 | | | | | 1 | 2 | 1 |
| DOWNY WOODPECKER | 2 | 1 | 2 | 1 | 2 | 2 | 6 | | 4 | 2 | 5 |
| HAIRY WOODPECKER | 7 | 1 | 1 | | 4 | 6 | 2 | 1 | 6 | | 2 |
| NORTHERN FLICKER | | | | | | | + | | | | |
| PILEATED WOODPECKER | 1 | | | | | 2 | | | 2 | | |
| HORNED LARK | | | 5 | 51 | | | + | | | 351 | 101 |
| GRAY JAY | 1 | | | | | 9 | | | 3 | | |
| BLUE JAY | 5 | 1 | 10 | | 4 | 2 | | | 15 | | |
| BLACK-BILLED MAGPIE | 26 | 2 | 59 | 13 | | 13 | 12 | 4 | 6 | 19 | 16 |
| COMMON RAVEN | 20 | 1 | | | 1 | 59 | | 6 | 8 | | |
| BLACK-CAPPED CHICKADEE | 15 | 3 | 38 | | 7 | 43 | 14 | 2 | 10 | 3 | 6 |
| BOREAL CHICKADEE | | | | | | 11 | | | 3 | | |
| RED-BREASTED NUTHATCH | | | | | | 4 | 1 | | 1 | | 1 |
| WHITE-BREASTED NUTHATCH | 4 | | | | | 1 | 3 | | 3 | | 5 |
| GOLDEN-CROWNED KINGLET | | | | | | | + | | | | |
| AMERICAN ROBIN | | | | | | | | | 1 | | + |
| BOHEMIAN WAXWING | | + | 21 | | | | 30 | | | | |
| CEDAR WAXWING | | 2 | | | | | | | | | |
| NORTHERN SHRIKE | | | 1 | | | | | | | | |
| EUROPEAN STARLING | | | | | | | 8 | | | 2 | |
| DARK-EYED JUNCO | 1 | | | | | | | | | | 4 |
| LAPLAND LONGSPUR | | | | | | | | | | 2 | |
| SNOW BUNTING | 20 | 86 | 390 | 300 | 30 | 315 | 50 | | 75 | 43 | 483 |
| RUSTY BLACKBIRD | | | | + | | | | | | | |
| PINE GROSBEAK | 6 | | | | 23 | 15 | | | 30 | | 1 |
| COMMON REDPOLL | | | 29 | | 13 | 2 | 4 | | 15 | | + |
| HOARY REDPOLL | | | | + | | | | | | | |
| PINE SISKIN | | | | | 2 | | | | | | |
| EVENING GROSBEAK | 18 | | 10 | | 17 | 2 | | | 15 | | + |
| HOUSE SPARROW | 57 | 40 | 54 | 150 | | 34 | 1239 | 8 | | 10 | 301 |
| NO. INDIV. TABLES 3 & 4 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 2 | 5 | 4 |
| NO. SPECIES COUNT DAY | 17 | 10 | 14 | 10 | 10 | 26 | 14 | 5 | 21 | 15 | 21 |
| NO. SPECIES COUNT PERIOD | 19 | 12 | 14 | 17 | 10 | 26 | 22 | 5 | 21 | 15 | 27 |
| NO. SPECIES TABLES 3 & 4 | 0 | 0 | 0 | 1 | 0 | 3 | 4 | 0 | 1 | 1 | 3 |
| NO. INDIV. COUNT DAY | 211 | 138 | 622 | 608 | 103 | 729 | 1425 | 21 | 212 | 479 | 1040 |

Table 3-8. SPECIES RECORDED FROM FIVE OR MORE LOCALITIES
(+ = a species seen during the count period but not on count day)

| | LOCATION AND DATE | | | | | | |
|---|---|---|---|---|---|---|---|
| SPECIES | 78. WHITE BEAR 02 Jan. 1993 | 79. WHITEWOOD 01 Jan. 1993 | 80. YORKTON 02 Jan. 1993 | | TOTAL INDIVIDUALS | NO. OF COUNTS COUNT DAY | NO. OF COUNTS COUNT PERIOD |
| CANADA GOOSE | | | | | 433 | 6 | 7 |
| MALLARD | | | 5 | | 7884 | 12 | 12 |
| COMMON GOLDENEYE | | | | | 336 | 8 | 8 |
| BALD EAGLE | | | | | 31 | 11 | 12 |
| NORTHERN GOSHAWK | | | | | 15 | 10 | 13 |
| GOLDEN EAGLE | | | | | 26 | 10 | 17 |
| MERLIN | | | | | 8 | 7 | 12 |
| GYRFALCON | + | | | | 5 | 4 | 7 |
| PRAIRIE FALCON | 1 | | | | 12 | 6 | 7 |
| GRAY PARTRIDGE | 12 | 8 | | | 709 | 33 | 37 |
| RING-NECKED PHEASANT | | | | | 125 | 14 | 18 |
| RUFFED GROUSE | | | 1 | | 35 | 15 | 21 |
| SHARP-TAILED GROUSE | 1 | 57 | 7 | | 847 | 37 | 41 |
| ROCK DOVE | 280 | + | 134 | | 3786 | 47 | 48 |
| GREAT HORNED OWL | + | + | | | 80 | 32 | 39 |
| SNOWY OWL | + | | 1 | | 65 | 32 | 37 |
| DOWNY WOODPECKER | | 1 | 11 | | 238 | 56 | 60 |
| HAIRY WOODPECKER | | 2 | 3 | | 231 | 58 | 59 |
| NORTHERN FLICKER | | | | | 11 | 4 | 5 |
| PILEATED WOODPECKER | | | | | 14 | 11 | 12 |
| HORNED LARK | + | 7 | | | 4475 | 27 | 31 |
| GRAY JAY | | | | | 103 | 19 | 19 |
| BLUE JAY | | + | 4 | | 323 | 47 | 48 |
| BLACK-BILLED MAGPIE | 16 | 37 | 15 | | 2578 | 75 | 76 |
| COMMON RAVEN | | 1 | 15 | | 1076 | 39 | 43 |
| BLACK-CAPPED CHICKADEE | | 45 | 75 | | 2230 | 69 | 71 |
| BOREAL CHICKADEE | | | | | 70 | 13 | 13 |
| RED-BREASTED NUTHATCH | | | | | 52 | 15 | 17 |
| WHITE-BREASTED NUTHATCH | | 2 | | | 135 | 35 | 36 |
| GOLDEN-CROWNED KINGLET | | + | | | 36 | 4 | 8 |
| AMERICAN ROBIN | | | | | 14 | 8 | 11 |
| BOHEMIAN WAXWING | | 1 | 166 | | 3550 | 31 | 34 |
| CEDAR WAXWING | | | | | 82 | 7 | 9 |
| NORTHERN SHRIKE | 1 | + | 1 | | 22 | 16 | 21 |
| EUROPEAN STARLING | + | 11 | | | 115 | 18 | 19 |
| DARK-EYED JUNCO | | | | | 37 | 15 | 16 |
| LAPLAND LONGSPUR | | | | | 284 | 5 | 5 |
| SNOW BUNTING | | 593 | 19 | | 13134 | 55 | 60 |
| RUSTY BLACKBIRD | | | | | 15 | 4 | 7 |
| PINE GROSBEAK | | | | | 487 | 31 | 34 |
| COMMON REDPOLL | | | | | 797 | 25 | 29 |
| HOARY REDPOLL | | | | | 48 | 4 | 6 |
| PINE SISKIN | | | | | 24 | 6 | 8 |
| EVENING GROSBEAK | | | | | 1562 | 29 | 30 |
| HOUSE SPARROW | 150 | 482 | 440 | | 14277 | 67 | 67 |
| NO. INDIV. TABLES 3 & 4 | 36 | 0 | 0 | | | | |
| NO. SPECIES COUNT DAY | 8 | 13 | 15 | | | | |
| NO. SPECIES COUNT PERIOD | 13 | 19 | 15 | | | | |
| NO. SPECIES TABLES 3 & 4 | 1 | 1 | 0 | | | | |
| NO. INDIV. COUNT DAY | 497 | 1247 | 897 | | | | |

## Table 4. SPECIES SEEN ON FEWER THAN FIVE COUNTS

| SPECIES | LOCATION AND NUMBER |
|---|---|
| YELLOW-BILLED LOON | Gardiner Dam, 1 |
| GREAT BLUE HERON | Crooked Lake, + |
| TUNDRA SWAN | Fort Qu'Appelle, + |
| AMERICAN BLACK DUCK | Regina, 2 |
| CANVASBACK | Gardiner Dam, 1 |
| LESSER SCAUP | Estevan, 7; Fort Qu'Appelle, 1; Saskatoon, 1 |
| BUFFLEHEAD | Estevan, 6; Fort Qu'Appelle, 1 |
| COMMON MERGANSER | Gardiner Dam, 256; Squaw Rapids, 11 |
| RED-BREASTED MERGANSER | Squaw Rapids, 1 |
| RUDDY DUCK | Estevan, 1 |
| NORTHERN HARRIER | Govenlock, 1 |
| ROUGH-LEGGED HAWK | Biggar, 1; Govenlock, 6 |
| SPRUCE GROUSE | Armit, 1; Prince Albert National Park, 2; Turtle Lake, 2 |
| SAGE GROUSE | Grasslands National Park, 11 |
| WILD TURKEY | Fort Qu'Appelle, +; Fort Walsh, 4; White Bear, 36 |
| AMERICAN COOT | Estevan, 14 |
| MOURNING DOVE | Hudson Bay, + |
| NORTHERN HAWK-OWL | Leader, 1; Prince Albert (B), + |
| GREAT GRAY OWL | Armit, 1; Candle Lake, 3; Prince Albert National Park, +; Snowden, + |
| SHORT-EARED OWL | Big Muddy Lake, 3; Regina, +; Skull Creek, 1; Spring Valley, +; Val Marie, 5 |
| THREE-TOED WOODPECKER | Armit, 1; Candle Lake, 2; Regina, + |
| BLACK-BACKED WOODPECKER | Armit, 3; Kamsack, 1; MacDowall, 1; Squaw Rapids, 2 |
| AMERICAN CROW | Moose Mountain, 1; Regina, 1; Skull Creek, 1 |
| BROWN CREEPER | Fort Qu'Appelle, 1; Pike Lake, 1; Regina, 1; Saskatoon, 1; Swift Current, + |
| TOWNSEND'S SOLITAIRE | Qu'Appelle Valley Dam, 1; Regina, +; Swift Current, + |
| VARIED THRUSH | Swift Current, + |
| AMERICAN TREE SPARROW | Fort Walsh, 15; Govenlock, 1; Grasslands National Park, 2; Raymore, + |
| LINCOLN'S SPARROW | Whitewood, + |
| WHITE-THROATED SPARROW | Prince Albert (B), +; Swift Current, + |
| WHITE-CROWNED SPARROW | Pike Lake, 1 |
| HARRIS' SPARROW | Prince Albert (B), 1; Skull Creek, 15 |
| RED-WINGED BLACKBIRD | Fort Walsh, 4 |
| WESTERN MEADOWLARK | Govenlock, 1 |
| BREWER'S BLACKBIRD | Weyburn, 3 |
| COMMON GRACKLE | Endeavour, 1; Regina, 2; Weyburn, 1 |
| ROSY FINCH | Fort Walsh, 23, Grasslands National Park, 6, Skull Creek, 20 |
| PURPLE FINCH | Crooked Lake, + |
| HOUSE FINCH | Regina, 2; Weyburn, + |
| WHITE-WINGED CROSSBILL | Marsden, 5; Pike Lake, 5 |

## Table 5. BIRDS NOT IDENTIFIED TO SPECIES

| SPECIES | LOCATION AND NUMBER |
|---|---|
| UNIDENTIFIED BIRD | Cabri, 1; Prince Albert National Park, 7 |
| WOODPECKER species | Big Muddy Lake, 1 |
| WAXWING species | Qu'Appelle Valley Dam, 14; Saskatoon, 25 |
| REDPOLL species | Big Muddy Lake, 6; Fort Walsh, 40; Saskatoon, 52 |

Table 6. SUMMARY OF NEW OR TYING HIGH COUNTS ESTABLISHED DURING THE 1992 COUNTS (tying counts regular type; boldface/italic indicates a new record; CP = count period species)

| LOCATION | 1992 COUNT | SPECIES | PREVIOUS HIGH | LOCATION AND YEAR |
|---|---|---|---|---|
| Gardiner Dam | 1 | Yellow-billed Loon | 1 | Gardiner Dam (91) |
| [Crooked Lake CP] | 1 | Great Blue Heron | 1 | Barrier Lake (88); Fort Walsh (85) |
| ***Regina*** | ***2*** | ***American Black Duck*** | ***1*** | ***north to Gardiner Dam*** |
| ***Estevan*** | ***6*** | ***Bufflehead*** | ***4*** | ***Douglas Provincial Park (88)*** |
| Govenlock | 1 | Northern Harrier | 1 | north to Harris |
| ***Govenlock*** | ***5*** | ***Prairie Falcon*** | ***4*** | ***Govenlock (86)*** |
| ***White Bear*** | ***36*** | ***Wild Turkey*** | ***26*** | ***Fort Walsh (88)*** |
| ***Estevan*** | ***14*** | ***American Coot*** | ***11*** | ***Regina (63)*** |
| Kamsack | 15 | White-breasted Nuthatch | 15 | Round Lake (84) |
| [Swift Current CP] | 1 | Varied Thrush | 1 | north to Pierce Lake |
| ***[Whitewood CP]*** | ***1*** | ***Lincoln's Sparrow*** | | ***NEW*** |
| Pike Lake | 1 | White-crowned Sparrow | 1 | north to Saskatoon |
| ***Skull Creek*** | ***15*** | ***Harris' Sparrow*** | ***3*** | ***Govenlock (86)*** |
| ***Regina and [Weyburn CP]*** | ***2*** | ***House Finch*** | | ***NEW*** |
| ***Kamsack*** | ***564*** | ***Evening Grosbeak*** | ***515*** | ***Kamsack (85)*** |

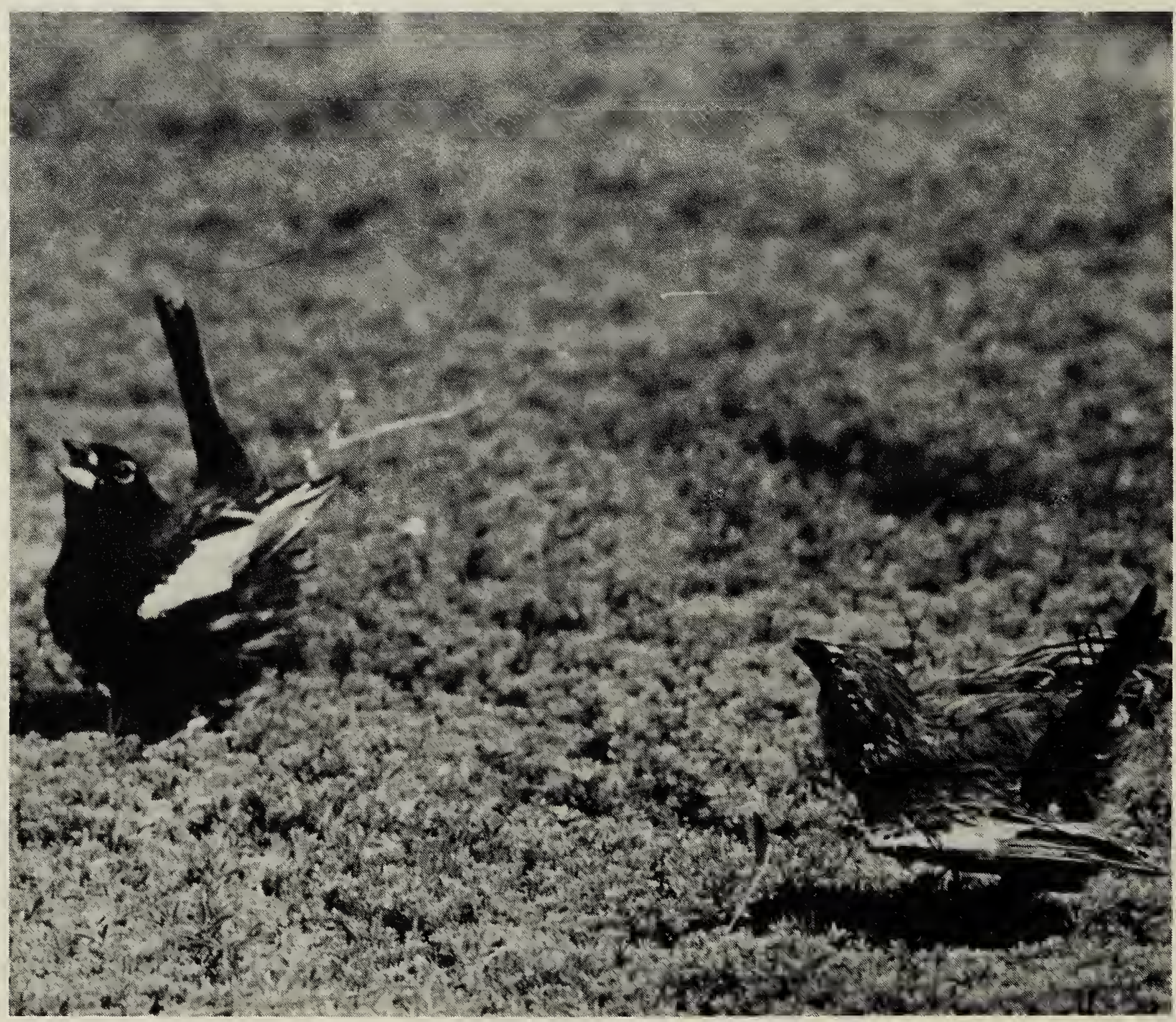
Table 7. COMPARISON OF 1992 POPULATIONS TO 1991 AND AVERAGE PAST YEARS (1987-1991) BASED ON PARTY HOURS PER INDIVIDUAL

| SPECIES | % CHANGE IN POPULATION 1992 VS. 1991 | % CHANGE IN POPULATION 1992 VS. AVERAGE 1987-1991 | SPECIES | % CHANGE IN POPULATION 1992 VS. 1991 | % CHANGE IN POPULATION 1992 VS. AVERAGE 1987-1991 |
|---|---|---|---|---|---|
| CANADA GOOSE | 16.3 | -65.1 | COMMON RAVEN | -14.3 | 13.4 |
| MALLARD | 217.0 | 21.0 | BLACK-CAPPED CHICKADEE | 7.5 | 23.2 |
| COMMON GOLDENEYE | 102.4 | -15.5 | BOREAL CHICKADEE | 34.6 | -2.8 |
| BALD EAGLE | 106.7 | 10.7 | RED-BREASTED NUTHATCH | -67.9 | -54.8 |
| NORTHERN GOSHAWK | -16.7 | 0.0 | WHITE-BREASTED NUTHATCH | 23.9 | 50.0 |
| GOLDEN EAGLE | -35.0 | -33.3 | BROWN CREEPER | 0.0 | -20.0 |
| MERLIN | 14.3 | -52.9 | GOLDEN-CROWNED KINGLET | 125.0 | 16.1 |
| PRAIRIE FALCON | 71.4 | 140.0 | AMERICAN ROBIN | -26.3 | -30.0 |
| GRAY PARTRIDGE | -57.5 | -48.3 | BOHEMIAN WAXWING | -12.1 | -56.7 |
| RING-NECKED PHEASANT | 10.6 | -16.7 | CEDAR WAXWING | -45.0 | -38.3 |
| SPRUCE GROUSE | -64.3 | -44.4 | NORTHERN SHRIKE | -35.3 | 4.8 |
| RUFFED GROUSE | -61.5 | -61.1 | EUROPEAN STARLING | -42.2 | -55.9 |
| SHARP-TAILED GROUSE | -37.7 | -16.5 | AMERICAN TREE SPARROW | -35.7 | -57.1 |
| ROCK DOVE | -20.7 | -30.3 | DARK-EYED JUNCO | -62.6 | -27.5 |
| GREAT HORNED OWL | 3.9 | -12.1 | LAPLAND LONGSPUR | -75.3 | -88.5 |
| SNOWY OWL | 27.5 | 20.4 | SNOW BUNTING | 24.4 | -19.0 |
| SHORT-EARED OWL | 125.0 | -47.1 | RED-WINGED BLACKBIRD | -89.7 | -69.2 |
| DOWNY WOODPECKER | -2.4 | 18.9 | RUSTY BLACKBIRD | -60.5 | -59.5 |
| HAIRY WOODPECKER | 3.1 | 17.8 | PINE GROSBEAK | -60.8 | -35.1 |
| THREE-TOED WOODPECKER | -57.1 | -62.5 | RED CROSSBILL | -100.0 | -100.0 |
| NORTHERN FLICKER | -57.7 | -31.3 | WHITE-WINGED CROSSBILL | -97.2 | -95.7 |
| PILEATED WOODPECKER | -41.7 | -12.5 | COMMON REDPOLL | -85.3 | -76.9 |
| HORNED LARK | 349.8 | 40.4 | HOARY REDPOLL | -72.4 | -61.9 |
| GRAY JAY | -9.6 | 13.2 | PINE SISKIN | -72.7 | -60.0 |
| BLUE JAY | -36.7 | -1.8 | EVENING GROSBEAK | -9.3 | 4.5 |
| BLACK-BILLED MAGPIE | -14.0 | 0.6 | HOUSE SPARROW | -8.8 | -14.8 |

# LARK BUNTING — WESTERN PRAIRIE MARVEL

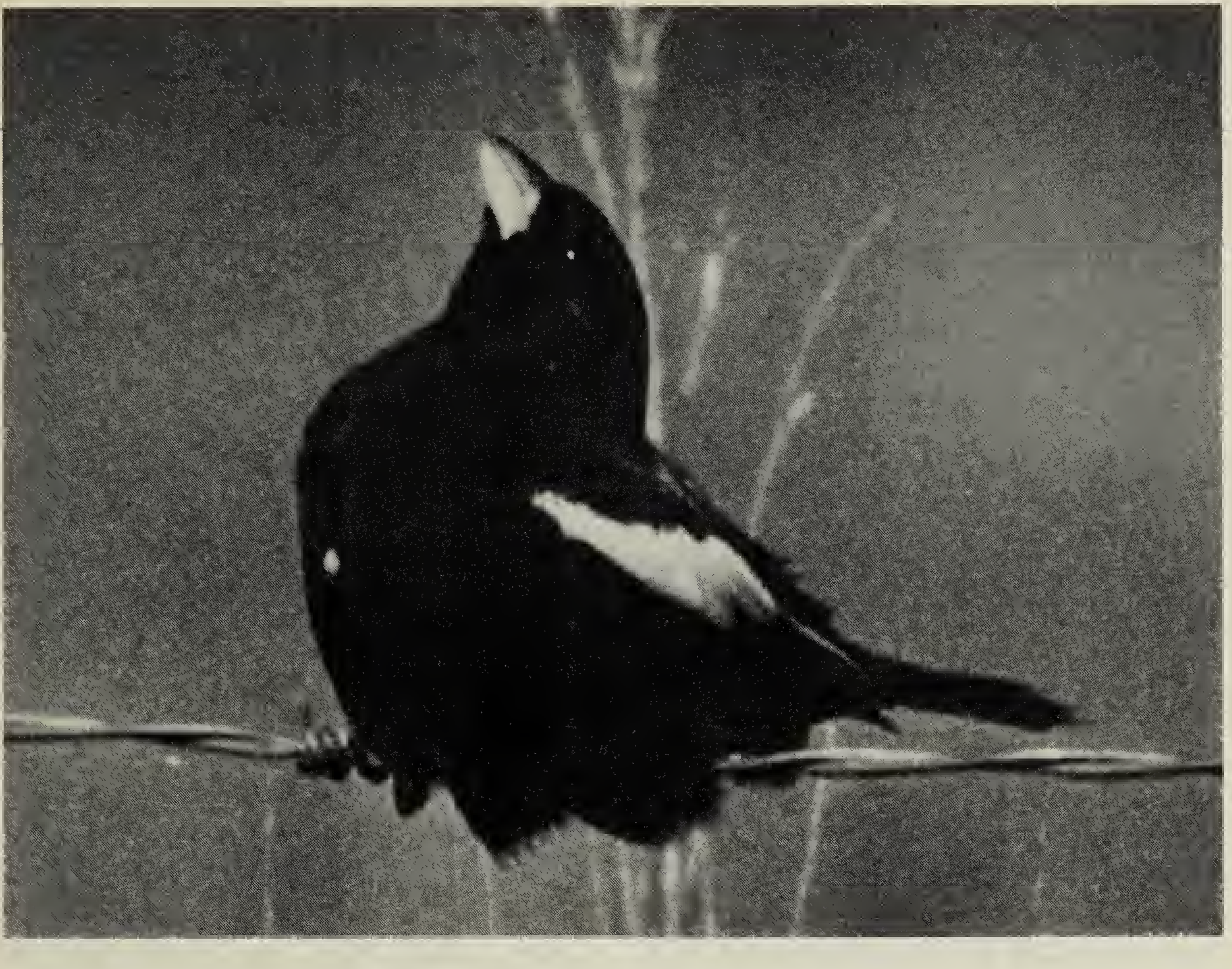
ROBERT W. NERO, Box 14, 1495 St. James Street, Winnipeg, Manitoba.
R3H 0W9

After seeing more than 50 raptors of 6 different species in one afternoon, I was unprepared for the excitement I still felt upon seeing a field of Lark Buntings. We had been driving through "Poverty Plains," an area of extreme southwestern Manitoba where there are a few large tracts of native mixed-grass prairie. The open grassland, mostly unimproved pasture, attracts Ferruginous Hawks, Burrowing Owls, Loggerhead Shrikes and Baird's Sparrows, all threatened or endangered species. We also found Lark Sparrows, Grasshopper Sparrows, Chestnut-collared Longspurs, Sprague's Pipits and Upland Sandpipers. But it was the Lark Buntings that excited me most. These small, blunt-headed finches, especially the conspicuous males with their striking white wing-patches, made me laugh with joy. Though I hadn't seen breeding Lark Buntings for nearly 24 years, I had once studied them closely. The sight



*Male Lark Bunting in extreme post-copulatory posture. Mounted female on right. (White eye-ring is an anomaly.)*

*Robert W. Nero*



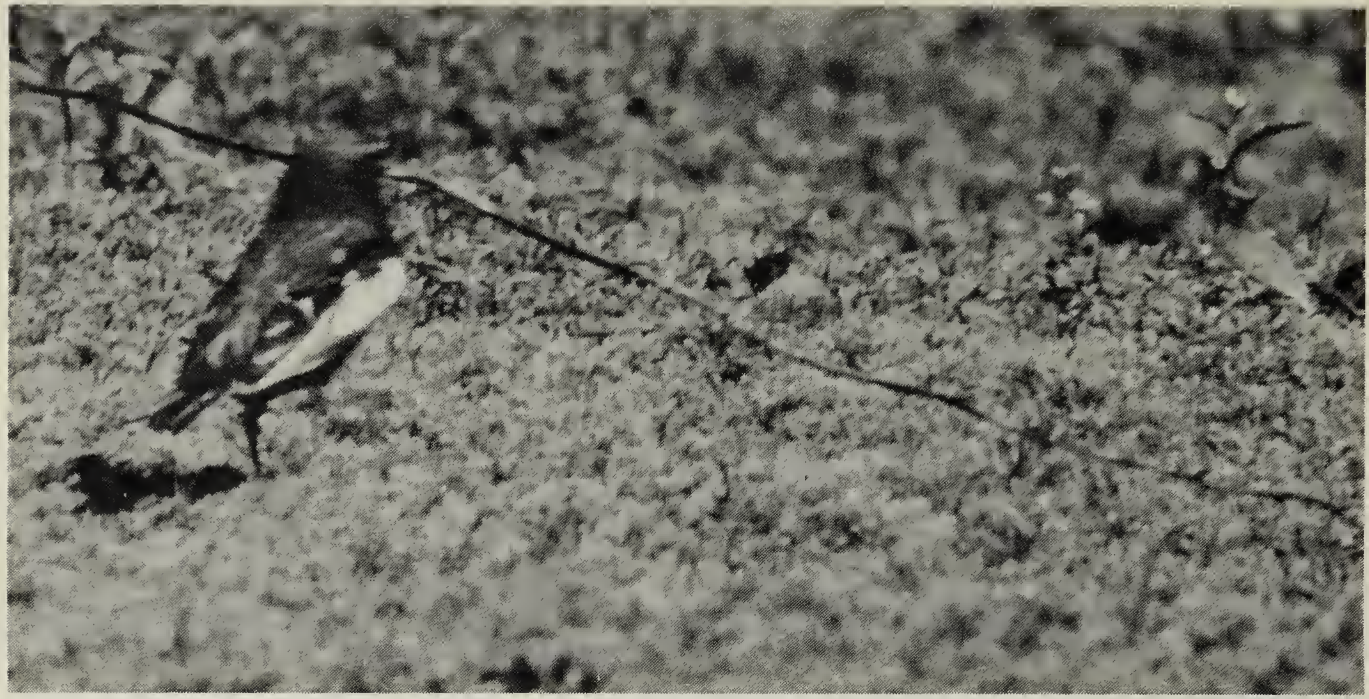
*Male Lark Bunting in post-copulatory display on fence wire.* *Robert W. Nero*

of several males in wild pursuit of a darting female reminded me of my earlier affair with this bird of the western prairies.

In 1964 Lark Buntings irrupted over a large area of the Northern Great Plains and east into southwestern Minnesota. That year they were numerous in southern Saskatchewan; many appeared overnight on remnant native prairie stands near where I lived in Regina. Captivated by this newcomer to my backyard, I undertook some simple experiments to try to elicit mating behaviour, the main results of which were eventually described in a note in the *Wilson Bulletin* in 1982.[2]

By using a mounted male and female Lark Bunting it was possible for me to observe and photograph some previously unreported Lark Bunting behaviour. A female dummy or mounted bird arranged in solicitation pose is a strong sexual stimulus. Even a poorly mounted bird will attract males. It may seem strange that birds should respond to such a model, but this three-dimensional image is a powerful stimulus. After all, despite our intelligence, we humans respond in not unsimilar fashion to mere two-dimensional images in pictures and film.

In my first experiment I placed a male and female dummy about 15 feet from a nest with four eggs. Both members of the pair and several other males responded to the dummies and this led to interactions between the male and his mate and the other males. I was especially intrigued by responses of males. A male's approach to the female dummy began with a run, head lowered, breast feathers spread, crown raised, followed by an upright pos-



*Male Lark Bunting carrying a 20-inch long weedstalk toward mounted female.* *Robert W. Nero*

ture as he came up behind the dummy and hopped onto its back. When he copulated, the head and neck feathers were compressed. It is what the male Lark Bunting does afterwards that is so engrossing. Instead of flying away after dismounting, the male jumps off, runs off a few feet, then turns and goes into a post-copulatory display, a static posture held rigidly for up to two minutes. For the ever-active male to suddenly stop moving and hold itself in a strained position, as if in a trance, is a surprising performance. We don't often see birds sitting so still and in this instance the effect is dramatic. One moment the male is soaring overhead in rollicking song, the next, it is frozen at our feet, drawn by the stimulus of the unrelenting female dummy. It is almost unbearable, ecstasy prolonged. I learned that this curious behaviour could be elicited by placing the female dummy wherever there were Lark Buntings.

In extreme post-copulatory display, and this usually occurred after an intense bout of copulation, the tail is held straight up, the head is withdrawn with bill lifted and open, and often the nictitating membrane is blinked. The wings are held partly open, usually the one on the side toward the dummy being held out more. In many respects, the male's post-copulatory posture resembles female sexual display, that is, readiness for copulation. Both male and female displays seem to be derived from a basic passerine juvenile food-begging posture. At first the post-copulatory display is rigidly held, but then the male gradually relaxes, the tail begins to lower, the wings quiver a bit, and the male comes back to life. Then the whole sequence may begin all over again, the male "winding up" and running back to the dummy for yet another episode. (Though my experiments have never caused a male Red-winged Blackbird to perform post-copulatory display, they have induced it in the Yellow-headed Blackbird, Chestnut-collared Longspur and McCown's Longspur.)

A female dummy in a position of sexual invitation seems irresistible to a breeding male. The excited male rushes to the dummy and frenziedly copulates, at times even depositing semen. The mesmerized male returns again and again to this love-object, sometimes grasping at straws, as it were, literally picking up a billful of grass stems as if for an offering. Once a male ran toward the dummy while holding a weedstalk about 20 inches long, a comical sight. I judged this to be part of courtship display, for males in many species of birds demonstrate with nesting material. In this connection, the conspicuous aerial display of the male, which is often followed by his suddenly dropping down into vegetation, appears to be part of a sequence of movements leading the female to nesting behaviour. The business of the male frantically picking up nest material is probably part of the pattern, but this requires further study.

Seeing Lark Buntings again out on the open, almost barren plains of southwestern Manitoba made me think that there may be much to be learned from this species. This bird's tendency to fluctuate in abundance from year to year has been noted by several writers. Wilson Tout, a Nebraska birder, commented in 1902 that it appeared to be more abundant in dry than in wet years.[1] Its appearance in large numbers in southwestern Manitoba in 1988 certainly coincided with widespread drought conditions. But other observers have associated its appearance with good crop years. Whenever it appears as a breeding species it attracts a lot of attention, its flight song, in particular, causing people to marvel at this nomad's attractiveness. In A. C. Bent's "Life Histories," always a good source of original material, there are some colourful descriptions of Lark Buntings.[1] Montana birder Charles L. Whittle wrote: "In every direction, first here and then there, often in a dozen places at once, Lark Buntings shot into the air, usually from the ground, as though propelled from guns, pouring out the most infectious and passionate song, perhaps, sung by any bird in the United States." Roy M. Langdon had this to say: "Several times I have heard him in the sunlit, sparkling rain. He is vocal when other birds seek shelter. Being strong of wing, he flies up to greet with song the cooling breezes or the gale that brings the storm. Sometimes he flies almost vertically up the wind, turns, and sails rapidly down the wind, bubbling with glee."

The Lark Bunting's preferred habitat on the western prairies is said to be the "sage prairie." Though it will use native prairie, it also seeks out disturbed sites where wolf-willow or silverberry (*Elaeagnus commutata*) and snowberry (*Symphoricarpos* sp.) are abundant. Its disappearance from the eastern parts of its range following the demise of the prairies, suggests that the Lark Bunting may be more vulnerable than we know. In our efforts to rescue endangered species we may be overlooking significant ecological relationships. Who knows what clues the Lark Bunting may provide? Spirited, sociable, conspicuous, with musical song that is as much a part of the landscape as native shrubs and grasses, the Lark Bunting is an exciting member of the High Plains avifauna of western North America.

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# YELLOW-BILLED CUCKOO SIGHTING IN REGINA

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About 9:00 a.m. on 28 May 1987, Bob Luterbach telephoned me to announce that he had just seen a Yellow-billed Cuckoo in Goose Hill Park (north of Wascana Lake and south of Quinn Drive, east of Broad Street). I went at once and found Bob, Robert Kreba and Chris Adam all searching, but we did not find the bird.

About five weeks later, on 6 July 1987, on an overcast day, I was walking west from the Willow Island parking lot on the south side of an extensive grassed area. When I reached a point just past the end of a southern boundary hedge, I noticed a long-tailed grayish bird flying rapidly westward on the north side of the grassed area, 60 m away. It was low, at eye level, so I had a side view but could see at once that it was a cuckoo. When it reached the trees at the west end of the grass, it swung to the left without altering its height above the ground, made a wide circle (about 20 m radius) and then returned over its previous route. When it was a short distance past where I stood watching it, the bird changed course, flying southeasterly a short distance then it swooped upwards into a densely leaved poplar close to the parking lot. As it did so, I saw the extensive rufous in the wings. I was 140 m from the tree which was approximately 10.5 m high.

According to Lowery, the Yellow-billed Cuckoo is a common summer resident known by "the yellow mandible, the rufous inner margins of the wing feathers, and the extensive white tips on the feathers of the long tail ... [which] immediately distinguishes this species from the Black-billed Cuckoo."[1] In the account of the latter he states that it has no rufous in the wings.[2]

Peterson states: "dull brown above and whitish below; further distinguished by the presence of rufous in the wings."[2] Later he again refers to "rufous in the wings" and notes that the Black-billed Cuckoo has no rufous in the wings.[3]

I saw my first Yellow-billed Cuckoo in Tennessee when my late wife, Marjie, and I were driving to Florida. We found the species to be relatively common and, although it nests about 4.5 m from the ground, I thought of it as a treetop bird. Occasionally, we witnessed the upward swoop to the treetop, rufous in the wings prominent, just as in the Regina bird.

I have no doubt of the identification of the bird I saw on 6 July 1987: a Yellow-billed Cuckoo. I recently spoke to Bob Luterbach on the telephone and learned that he had seen it very briefly, so my sighting supports his report.

As I neither shot, photographed nor taped the bird, I offer the sighting as an addition to the Hypothetical List of Saskatchewan Birds.

I firmly believe that additions to the Hypothetical List should be "first person" accounts, and should be published in the *Blue Jay*, as relatively few members receive *American Birds*. Such would allow each member to scrutinize the account and learn how the identification was made.

I do not know why I did not write up the sighting in 1987. About that time I was involved in endless details of a projected trip to Kenya, so I expect I was distracted.

I want to thank Bob Ewart, of Wascana Centre Authority, for providing me with a plan of the grassed area with precise measurements.

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*Northern winter scene.* *J.B. Gollop*

# SASKATCHEWAN RESULTS OF THE 1991 INTERNATIONAL PIPING PLOVER CENSUS

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In the spring of 1991, attention from researchers and naturalists across Canada and the United States was focused on the Piping Plover. All 9 provinces and 28 states where Piping Plovers are known to breed participated in a coordinated effort of a complete census of Piping Plover breeding habitat. This census was the most extensive ever undertaken for a nongame species. The goal was to attain a reliable estimate of the current Piping Plover population. In Saskatchewan, the survey was coordinated by the authors.

The Piping Plover, a small shorebird that nests on sandy or gravelly beaches of temperate North America, occurs on the Prairies and Great Plains, in a declining area of the Great Lakes region, and along the Atlantic coast. It was likely never abundant because of its very specific needs and choice of transitional habitat.[3] That its numbers had declined was first suggested by Bell and Cairns and McLaren.[2,4] Recent surveys indicate that the decline may have continued because of habitat deterioration caused by drought conditions in the 1980s on the Prairies, and increasing human disturbance. In 1985, the Piping Plover was designated "Endangered" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).[7]

Historical information on Piping Plovers in Saskatchewan is limited.[5,19,20,21] Piping Plover censuses have been conducted in Saskatchewan since 1984.[11,12,14,16,17,19,26] The provincial population estimate of 2,000-2,500 in 1984 was down to 700-800 in 1986, and to 500 in 1988.[6] Because past surveys addressed only part of the species range in any one season, it was not known whether the apparent population changes were due to movement or real population change.

**Selection and Surveying of Sites**

All wetlands south of the boreal forest in Saskatchewan, as well as along the southern edge of the boreal forest, and the south shoreline of Lake Athabasca were considered for the survey.

Data on basins with previous Piping Plover use and on areas previously searched for plovers, as well as suggestions from volunteers, were evaluated to select census sites.[22,23] Topographical maps (1:250,000) were studied to locate wetlands with no previous information. Many of these were subjectively selected, including those believed to have potential breeding habitat.

Ninety wetlands of recent (1984 or later) use or good potential for Piping

*Pair of Piping Plovers.* *Keith Barr*

Plovers were surveyed by biologists from Saskatchewan Wildlife Branch (SWB) and Canadian Wildlife Service (CWS), or were tendered out to consulting biologists on a contract basis. Five of these wetlands were surveyed as part of a separate Piping Plover project, but within the guidelines of this census.[13]

The hilly Missouri Coteau contains hundreds of basins of varying size, many with gravelly beaches. Because it was impractical to visit each, an aerial survey was conducted in this area on 8-10 May 1991 to identify suitable sites. Almost 200 of these were surveyed by biologists from SWB, CWS, and United States Fish and Wildlife Service (USFWS).

Over 80 volunteers participated in surveying 208 additional sites. These included basins with less recent records of Piping Plovers (previous to 1984), basins surveyed since 1984 that had no plovers but were identified as having possible habitat, and the selected basins for which there was no previous information.

All surveys were conducted between 26 May and 21 June 1991. Surveys followed the schedule and procedure set out in the Guidelines for the 1991 International Piping Plover Breeding Census.[8,24] In addition, data on habitat and potential threats to the habitat were collected.

For each site, surveyors mapped all observations of breeding pairs, single adults with nests, and unpaired adults. Only actual observed individuals were reported. Pairs were recorded only where two territorial adults, presumed mated, were seen. A single adult with a nest or young was also considered a pair. Further details of methodology are available.[24,25]

**Results** A total of 1,172 adult birds was counted in Saskatchewan. Of the 486 wetlands surveyed, Piping Plovers were found at 71 sites (Table 1). At 57 sites, one or more pairs were found; this indicates potential breeding locations.

Sites with Piping Plovers were not distributed uniformly (Figures 1 and 2). Clusters of plovers were found in the Missouri Coteau, along the eastern portion of Lake Diefenbaker, and in the Big Quill-Houghton Lakes and Manito Lake (also called Manitou Lake) areas. Four sites accounted for 651 Piping Plovers, or 56% of the Saskatchewan population. These sites were Lake Diefenbaker, Big Quill Lake, Chaplin Lake and Manito Lake.

The highest count of Piping Plovers was at Lake Diefenbaker, with 276 plovers. The large population of plovers was concentrated towards and in the Thomson and Gordon McKenzie arms (to Gardiner and Qu'Appelle Valley dams, respectively) of this huge reservoir. A total of 223 plovers was found in the arms, and 53 plovers in the eastern two-thirds of the body of the lake.

At Big Quill Lake, with 151 plovers, distribution was around the entire lake. At Chaplin Lake, all 113 plovers were found in the northern half of the lake and concentrated in the western (main salt mine) basin. At Manito Lake, with 111 plovers, distribution was greatest in the southeast bay and along the southwest and northern shores.

The Missouri Coteau also harboured an abundance of plovers. The 345 Piping Plovers counted here in 1991 were scattered over 39 of the 112 sites identified as having potential habitat. Including the 113 plovers at Chaplin Lake, the total count of 458 plovers for the Missouri Coteau comprised 39% of the Saskatchewan population.

Following drought conditions from 1984-1990, the spring of 1991 was exceptionally wet.[24] At most sites, weather did not notably affect the census results. However, populations may have been underestimated at Lake Diefenbaker, Big Quill Lake and Chaplin Lake.[13]

A total of 223 sites yielded no Piping Plovers, but either had habitat, or the potential for habitat in some later year.[24] A large number of sites (192) was judged to have no potential.[24]

**Discussion** The total North American count was 5,482 Piping Plovers, including 2,441 breeding pairs.[8] This is a very close estimate of the number of Piping Plovers remaining on earth. That this number is small is realized when compared to the estimates of hundreds of thousands of individuals of many other shorebird species.

Saskatchewan's count of 1,172 plovers was the highest of the provinces or states, followed by North Dakota with 992 plovers and Nebraska with 398. Piping Plovers were concentrated on the Northern Great Plains/Prairie, where 3,467 plovers were counted compared to 1,975 on the Atlantic coast and 40 on the Great Lakes.[8] Saskatchewan's count comprised 60.1% of the Canadian population of 1,950 plovers, and 21.4% of the total North American count.

The largest breeding population of any basin in North America was found at Lake Diefenbaker, with 5.0% of the total population (8.0% of the Prairie population). Big Quill Lake ranked 6th in North America, with 2.8% of the population (4.4% of the Prairie population), Chaplin Lake ranked 8th with 2.1% of the population (3.3% of the Prairie population), and Manito Lake ranked 9th with 2.0% of the population (3.0% of the Prairie population).

Parts of Lake Diefenbaker have been surveyed since 1984.[9,11,12,15] Counts in the arms of the lake, where five years of complete surveys have been conducted, have varied from a low of zero plovers in 1986, to a high of 223 in 1991.[9,13] These dramatic fluctuations in number appear to be directly related to water level. In 1986, water levels were very high at the time of the survey and beach width was significantly reduced, in contrast to low levels in 1991.

Rapid increases in water level as the Lake Diefenbaker reservoir fills represent a significant threat to the species in Saskatchewan. In 1991, water level increased 6.55 m during the breeding season (1 May to 18 July). When water levels are low, as usually occurs at the time of nest initiation, habitat appears to be excellent and attracts large numbers of plovers. When water levels rise above beaches, nesting or family groups of plovers are flooded and habitat availability is reduced to near zero. Rapid rises can occur within a period of one or two weeks. When this occurs in mid-June or July, plovers rarely renest elsewhere, resulting in very low productivity.

Big Quill Lake has consistently yielded plovers, and regularly high counts, since annual surveys began in 1984. Counts varied from a low of 43 plovers in 1989, when less than 25% of the basin contained water, to a peak of 300+ in 1985.[10,11] Although the water level has continued to decline since 1989, the population has been increasing, and reached 151 in 1991.[13]

Changing habitat quality likely influenced population fluctuations at Big Quill Lake. By 1989, water levels had receded such that distances from traditional nesting beaches to water increased to 1-10 km.[11] In 1990, plovers began nesting on gravel beaches closer to the existing water level; use was likely due to vegetative growth along these previously barren beaches.[12] Use of the new beaches increased in 1991.[13] The Piping Plover population may continue to increase if habitat suitability of new beaches increases. However, a rise in water level may flood the new beaches and cause a marked reduction in available nesting habitat.

Chaplin Lake, a large, shallow lake comprised of four connected basins, has consistently supported Piping Plovers. The peak count of 253 plovers in a 1984 survey of 48% of the shoreline contrasts with the counts of only 57 plovers and 66 plovers in complete surveys in 1987 and 1990, respectively, when water levels were very low.[12,14,15] In years of low water, birds were concentrated on basins with the most water. An increase in the plover population in 1991 to 113 birds corresponded to an increase in water levels due to heavy precipitation.[13]

With productivity at Chaplin Lake higher than at other sites where the Piping Plover has been monitored, this site is important to its recovery.[25] Except for unpredictable drought conditions, few factors threaten the population here.

The high count of 111 Piping Plovers at Manito Lake was unexpected, although plovers have been previously found here.[15] The entire shoreline was surveyed for the first time in 1991 and yielded 81 plovers along the lake shore and 30 on the large island. Piping Plover usage was restricted to areas of abundant good nesting habitat. Most of this habitat was occupied by plovers, whereas much of the habitat judged as poor quality was unused. In some areas of use by cattle, suitability of habitat was reduced due to heavy trampling.

Many basins in the Missouri Coteau have been previously surveyed.[24] Most of these had noticeably higher counts in 1991 than on earlier surveys, including: Sandoff, East Coteau, West Coteau, Big Muddy, Fife, Willowbunch, Edna, Elsie and McDonaugh Lakes. Likely the heavy precipitation in the spring of 1991 replenished water in basins that had become very low or dry. With 42 plovers in 1991, Old Wives Lake, where water levels remained low, had a similar count of 39 plovers in a 1984 survey of 72% of the shoreline.[15]

Montague Lake is an exception to the observed pattern: 12 plovers were counted in a 1984 survey of 53% of the shoreline versus only 4 plovers in 1991.[15] Severely reduced beach width in 1991 due to higher water (W. C. Harris, pers. comm.) likely accounted for the low population.

Missouri Coteau basins, like others in southern parts of the province, tend to be shallow and are often small. Habitat conditions are in flux, reflecting an interplay of water level and vegetative encroachment. As a result, the population level appears to be unstable and to fluctuate from year to year.

Cattle were identified as posing a threat to the plover population at 10 sites, and to a much lesser extent at 10 other sites.[24] Further investigation may disclose cooperative ways of reducing this threat.

Several other areas consistently support small populations of Piping Plovers. At Redberry Lake, where the count was 21 in 1991, surveys since 1984 indicate a declining population, with a peak count of 41 plovers in 1985.[13,18] Northeast of Saskatoon, in the Muskiki-to-Lenore Lakes areas, 43 plovers were counted at 7 basins, 6 of which have previous records.

The Great Sandhills area of southwest Saskatchewan supports a small population. Seven Piping Plovers were counted in 1991 at two basins, Freefight and Ingebright Lakes, and Piping Plovers were noted at a third, Antelope Lake, in 1986 (14 plovers), 1988 and 1989 (W. C. Harris, pers. comm.).[26] Scattered historical records indicate that the wetlands in western Saskatchewan, between the South Saskatchewan River and North Battleford, supported plovers during the 1970s.[22] These basins tended to be low or dry and overgrown with vegetation in 1991, and very few of them had plovers.

A survey of about 75% of the south shore of Lake Athabasca yielded no Piping Plovers. Although there are reports of one plover in 1981 and a single adult and one pair with flightless young in 1982, lack of any plovers on the first thorough survey indicate this area is not consistently used.[1]

**Conservation Action** Conservation benefits of the 1991 census are assured. Critical Piping Plover breeding habitat throughout Saskatchewan has been determined and mapped.[24] Habitat was designated as critical if the beach was used by one or more pairs in at least one year since 1984, and it seemed reasonable to expect repeat use. In most cases, designations are the result of 1991 surveys.

The critical habitat information has been transferred to the Saskatchewan Department of Natural Resources Geographic Information System (GIS). The GIS is currently being used in many areas of resource management in Saskatchewan. This ensures that the critical habitat information for Piping Plovers, along with other species, is widely available to make conservation decisions concerning specific locations.

Follow-up work to understand the effect of water level changes at Lake Diefenbaker was begun by SWB in 1991, and continued in cooperation with the University of Regina and CWS in 1992. SWB and CWS have also initiated a dialogue with Sask Water Corp about including Piping Plover in water management planning. Also, North American Waterfowl Management Plan (NAWMP) partners are incorporating benefits to Piping Plovers and other shorebirds, as well as ducks and geese, in NAWMP projects.

Further action could include long-term productivity studies at other basins, developing rotational grazing systems with land owners which keep cattle off beaches during the breeding season, and reducing or eliminating other identified threats to plover habitat.[24] Perhaps, as a future step, all landowners with critical Piping Plover habitat may be made aware of its significance and develop an interest in protecting plover habitat, and thereby help ensure its recovery on the Prairies.

**Acknowledgements** This project was made possible through the financial support of the Endangered Species Recovery Fund (ESRF; funded by World Wildlife Fund, CWS and Outdoor Canada/Sportsmen Shows), Elsa Wild Animal Appeal, CWS, USFWS, and Saskatchewan Natural History Society (SNHS). Invaluable logistical and manpower contributions were provided by SWB of Saskatchewan Natural Resources, as well as CWS, USFWS, and SNHS.

We would like to thank the many people who conducted the survey work, including the biologists from SWB (15), CWS (6) and USFWS (6), the contract biologists (12) and the more than 80 volunteers. We thank J.P. Goossen, S.P. Fleming, W.C. Harris and C. Schroeder for their comments on an earlier draft of this manuscript. We also are grateful to W.C. Harris for encouragement to complete this manuscript.

Participants in the survey were: Stuart Alexander, Bill Anaka, Joyce Anaka, Alan Arsenault, Syd Barber, Keith Barr, Sam Barry, Tom Bartlett, Myron Barton, Neva Bayliss, Rhys Beaulieu, Margaret Belcher, Pat Bergstrom, Lionnel Bonneville, Stefan Bonneville, John Bord, Ed Brochmeyer, Dorothy Brown, Paul Burke, Gary Carlson, Muriel Carlson, Paul Chytyk, Mike Crofts, Ben Cruise, Ryan Csada, Arnold Dast, T. C. Dauphine, Doug Dean, John Deptuch, Brett Diemert, Ken Dillabaugh, Dwight Dobson, Carman Dodge, Ed

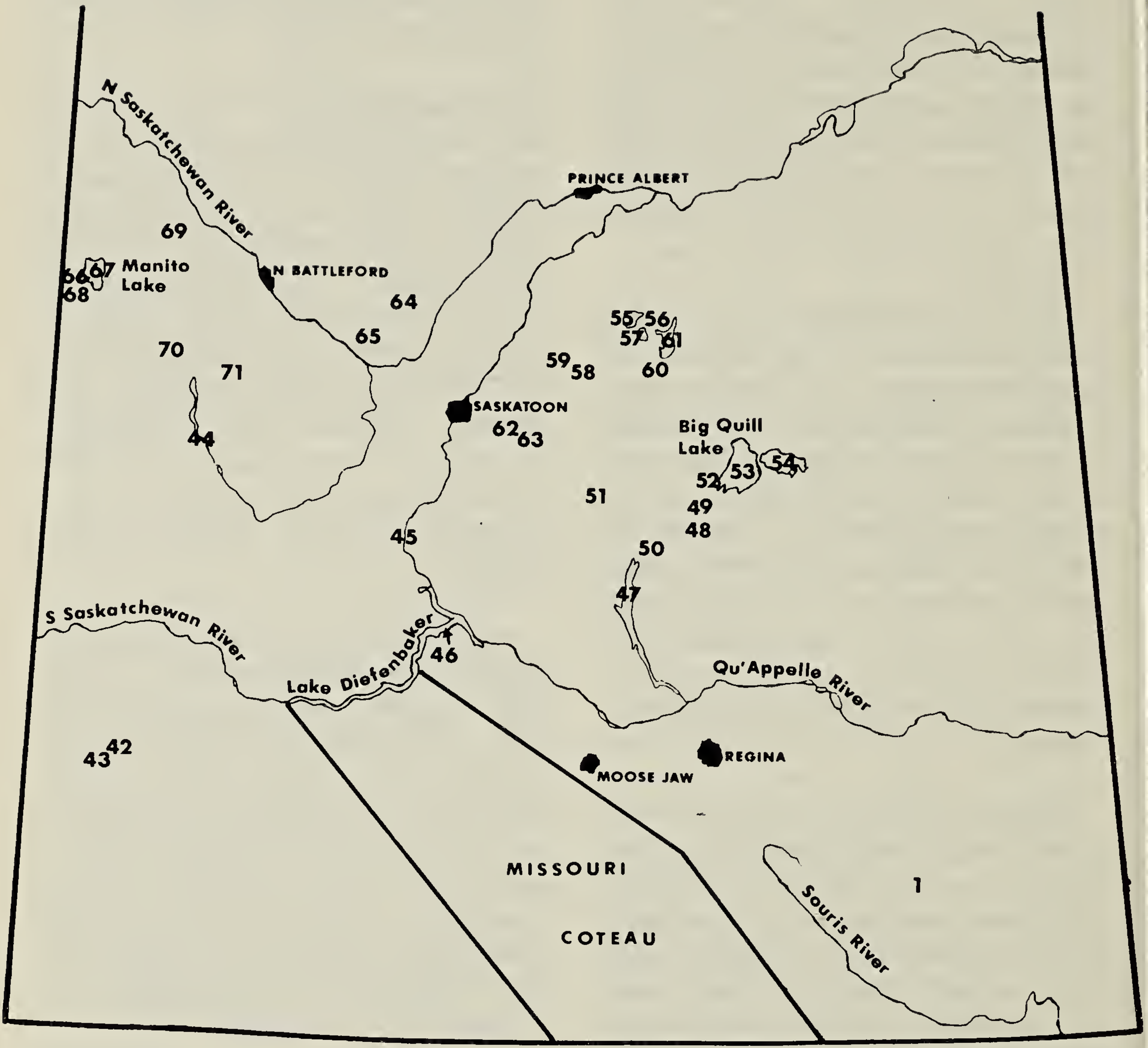

Figure 1. Piping Plover locations, excluding the Missouri Coteau.

Driver, Margaret Driver, Chris Dunn, Jim Elliott, Kay Ferguson, Mary Ferguson, Kim Finley, Jane Forster, Hartley Fredeen, Bernie Gollop, Mike Gollop, Stuart Golly, J. Paul Goossen, Russell Griffith, J. Gorham, Al Gurnsey, Wayne Harris, Cathy Harron, Don Harron, Howard Harter, Gordon Herterman, Merv Hey, Dale Hjertaas, Paule Hjertaas, Warren Hjertaas, Jim Hutchinson, Phyllis Ilsley, Grev Jones, Matina Kalcounis, Elaine Konkin, Fred Konkin, Wally Kost, Bob Kreba, Glen Kurjata, Anne Lambert, Tim Lash, Ella Leiter, Rudi Leiter, Bob Luterbach, Michael MacKay, Ron MacKay, R. Marvin, Susan McAdam, Don McDonald, Yvonne McKenzie, Karen McKeown, Richard Miller, Shirley Miller, Brad Muir, Craig Palmer, Cheryl Penny, David Peters, Dave Phillips, Karen Pretzer, Mark Pretzer, Sharon Procyshyn, Sandra Reyers, Laura Robinson, Allan Rokosh and 1st Ituna Boy Scouts, Jacques Saquet, Lloyd Saul, Dan Sawatzky, Adam Schmidt, Jeffrey

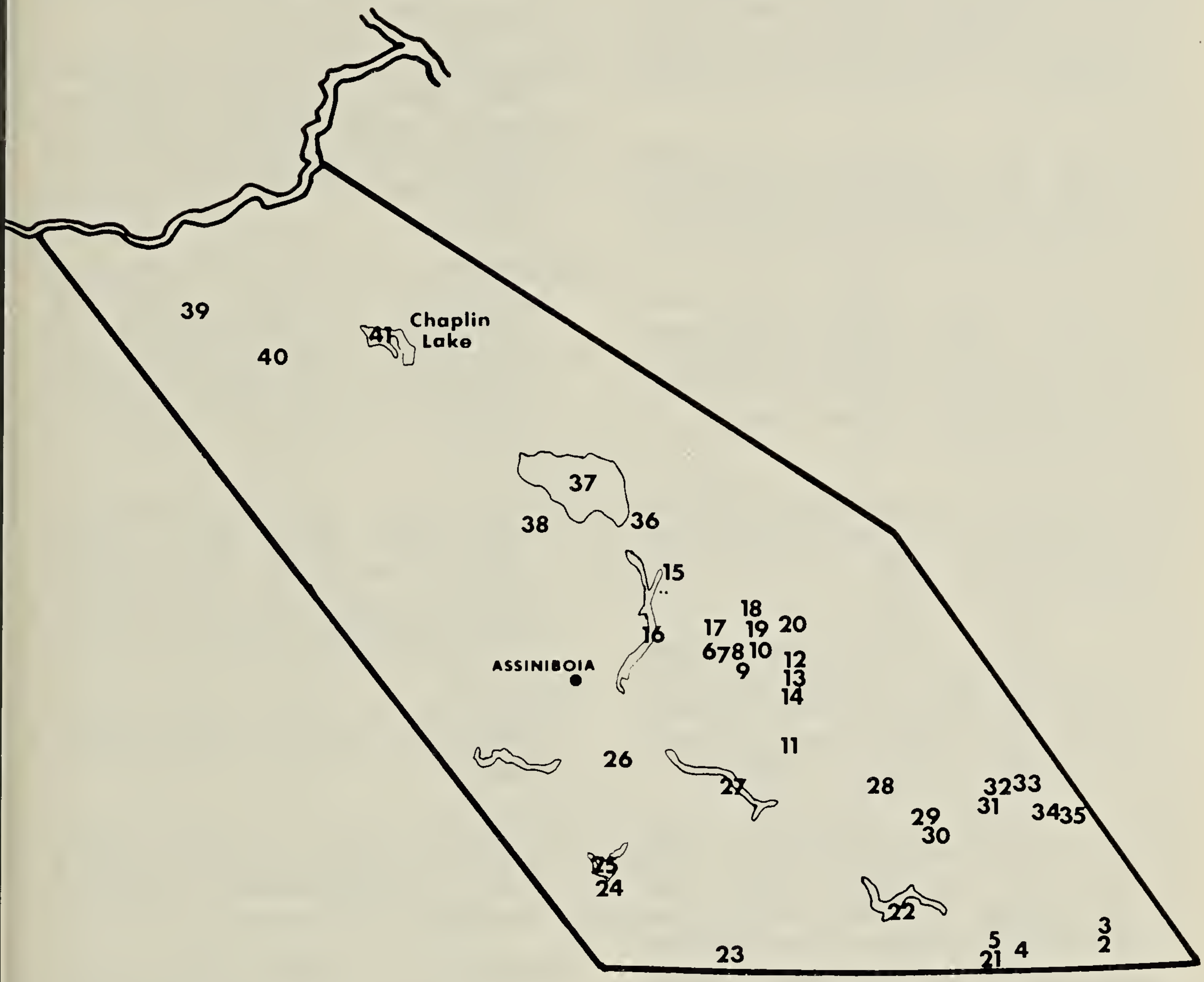

Figure 2. Piping Plover locations in the Missouri Coteau.

Schnurr, Margaret Skeel, Alan Smith, Roy Smith, Bill Stern, Paul Stevel, Bob Stratton, Frank Switzer, Monica Tan, Doug Taylor, Tim Trottier, Ed Walker, Jim Wedgwood, Shirley Wedgwood, Anne Weerstra, Bryne Weerstra, Don Weidl, Michael Williams, Jim Wood, Lois Wooding, Milow Worel and Steve Young.

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Table 1. SASKATCHEWAN SITES WITH PIPING PLOVERS IN 1991

| No. | Date | Water level | Site[a] | No. birds | No. pairs | % habitat[b] |
|---|---|---|---|---|---|---|
| 1 | 02 June | low | Rock Lake | 1 | 0 | 100 |
| 2 | 05 June | normal | 613 345 (&2H1) | 7 | 3 | 100 |
| 3 | 05 June | normal | Sandoff Lake | 25 | 8 | 95 |
| 4 | 13 June | normal | East Coteau Lake | 23 | 10 | 100 |
| 5 | 13 June | high | West Coteau Lake | 7 | 3 | 100 |
| 6 | 10 June | low | Dryboro Lake | 5 | 3 | 100 |
| 7 | 07 June | low | 650 075 (72H11) | 2 | 0 | 95 |
| 8 | 07 June | low | Burn Lake | 4 | 2 | 95 |
| 9 | 07 June | low | 705 056 (72H11) | 15 | 7 | 97 |
| 10 | 10 June | low | Shoe Lake | 4 | 2 | 92 |
| 11 | 05 June | low | Channel Lake | 19 | 5 | 90 |
| 12 | 08 June | low | 840 020 (72H11) | 8 | 3 | 100 |
| 13 | 08 June | low | 842 003 (72H11) | 2 | 0 | 80 |
| 14 | 08 June | low | 846 020 (72H11) | 4 | 2 | 100 |
| 15 | 08 June | low | 540 279 (72H11) | 11 | 5 | 90 |
| 16 | 07 June | low | Lake of the Rivers | 6 | 2 | 100 |
| 17 | 03 June | normal | Bliss Lake | 3 | 1 | 100 |
| 18 | 06 June | low | Skyeta Lake | 2 | 1 | 95 |
| 19 | 06 June | low | Oro Lake | 1 | 0 | 100 |
| 20 | 09 June | low | 842 162 (72H14) | 2 | 1 | 90 |
| 21 | 06 June | normal | Lonetree Lake | 2 | 1 | 100 |
| 22 | 07 June | low | Big Muddy Lake | 26 | 8 | 95 |
| 23 | 09 June | normal | Coronach Reservoir | 5 | 1 | 100 |
| 24 | 08 June | low | Grant Lake | 1 | 0 | 100 |
| 25 | 13 June | normal | Fife Lake | 29 | 9 | 100 |
| 26 | 12 June | low | Montague Lake | 4 | 1 | 100 |
| 27 | 10 June | low | Willow Bunch Lake | 31 | 16 | 100 |
| 28 | 06 June | low | Edna Lake | 7 | 4 | 95 |
| 29 | 03 June | low | McGrath Lake | 1 | 0 | 100 |
| 30 | 03 June | low | Salt L (72H7) | 1 | 0 | 100 |
| 31 | 05 June | low | Elsie Lake | 15 | 6 | 100 |
| 32 | 06 June | low | McDonaugh Lake | 11 | 4 | 100 |
| 33 | 06 June | low | 360 717 (72H7) | 1 | 0 | 100 |
| 34 | 05 June | normal | 514 656 (72H8) | 3 | 0 | 100 |
| 35 | 05 June | normal | Karl Lake | 2 | 1 | 100 |
| 36 | 06 June | low | Frederick Lake | 12 | 5 | 90 |
| 37 | 12 June | low | Old Wives Lake | 42 | 17 | 100 |

| No. | Date | Water level | Site[a] | No. birds | No. pairs | % habitat[b] |
|---|---|---|---|---|---|---|
| 38 | 07 June | low | 170 394 (72J1) | 1 | 0 | 100 |
| 39 | 06 June | low | Handsome Lake | 1 | 0 | 40 |
| 40 | 11 June | normal | Reed Lake | 1 | 0 | 100 |
| 41 | 11 June | high | Chaplin Lake | 113 | 15 | 100 |
| 42 | 27 May | normal | Freefight Lake | 5 | 2 | 100 |
| 43 | 27 May | normal | Ingebright Lake | 2 | 1 | 60 |
| 44 | 08 June | low | Tramping Lake, s end | 2 | 1 | 50 |
| 45 | 04 June | low | middle S Sask. R | 1 | 0 | 100 |
| 46 | 13 June | low | Lake Diefenbaker | 276 | 122 | 97 |
| 47 | 11 June | low | Last Mountain Lake | 9 | 3 | 95 |
| 48 | 10 June | low | Kutawagan L complex | 8 | 3 | 100 |
| 49 | 07 June | low | Lac du Chemin | 5 | 2 | 100 |
| 50 | 09 June | normal | Colt Lake | 4 | 2 | 100 |
| 51 | 10 June | normal | Little Manito Lake | 28 | 12 | 100 |
| 52 | 01 June | normal | 247 380 (72P15) | 1 | 0 | 100 |
| 53 | 14 June | low | Big Quill Lake | 151 | 54 | 90 |
| 54 | 06 June | normal | Little Quill Lake | 13 | 5 | 100 |
| 55 | 03 June | low | Basin Lake | 4 | 1 | 95 |
| 56 | 04 June | low | Elkona Lake | 5 | 3 | 100 |
| 57 | 10 June | low | Middle Lake | 4 | 1 | 100 |
| 58 | 04 June | normal | Muskiki Lake | 11 | 5 | 100 |
| 59 | 16 June | low | Buffer Lake | 3 | 2 | 95 |
| 60 | 04 June | low | Houghton Lake | 7 | 3 | 100 |
| 61 | 03 June | low | Lenore Lake | 9 | 4 | 75 |
| 62 | 04 June | normal | 103 667 (73B1) | 2 | 1 | 100 |
| 63 | 14 June | normal | 155 642 (73B1) | 1 | 1 | 75 |
| 64 | 05 June | normal | Redberry Lake | 21 | 11 | 100 |
| 65 | 04 June | normal | Radisson Lake | 5 | 0 | 100 |
| 66 | 04 June | normal | 964 390 (73C12) | 3 | 1 | 100 |
| 67 | 07 June | normal | Manito Lake | 111 | 51 | 100 |
| 68 | 04 June | low | West Reflex Lake, SK | 5 | 2 | 100 |
| 69 | 08 June | low | Lambert Lake | 4 | 2 | 100 |
| 70 | 04 June | low | Killsquaw Lakes | 4 | 1 | 80 |
| 71 | 11 June | normal | Aroma Lake | 8 | 3 | 100 |
| Total | | | | 1,172 | | 481 |

[a] Unnamed sites are identified by universal Transverse Mercator (UTM) grid number and map sheet.

[b] Percent of estimated Piping Plover habitat that was censused.

# SUMMER TANAGER AT DAUPHIN, MANITOBA

WILLIAM J. WALLEY, 222 Bossons Avenue, Dauphin, Manitoba. R7N 0R2

Manitoba records of the Summer Tanager were summarized by Jim Purdy when he reported an adult male near Russell, the eighth documented individual for the province.[2] This report documents another Manitoba record.

Failing to see or hear the tanager near Russell 3 April 1986 (not 13 April as reported[2]), my chances of ever recording one seemed slim. The scenario in which I was to see my first was most improbable. At noon 15 May 1990, while having lunch in the Dauphin Regional Comprehensive Secondary School staff dining room, a student, Bob Kostuchuk, delivered a Summer Tanager to me at my table. We took it to the Biology Room and put it in a small bird cage. The bird thrashed about wildly, then settled down and quickly took and swallowed several mealworms offered to it. Kostuchuk said that it had been on the grass on the north side of the school and had flown up onto his shoulder, then onto a companion whereupon he caught it by hand. The bird was a first year male (see photo).

Field guides consulted ensured that the tanager was not a Hepatic Tanager, a similar species which also nests in the southern United States but not in Canada. Following is the description of the bird: length about 17 cm; head and breast red with an orange tinge; nape a mottling of olive through the red-orange; tail, outer feathers gray-brown edged with yellow, middle feathers gray; undertail coverts bright yellow; upperwing brown with olive edges; underwing gray with yellow near the body; beak, which was large for the size of the bird, gray with light yellowish edges; legs gray.

Several local birders observed and photographed the tanager in the Biology Room and a brief writeup and photograph appeared in the local paper. On 16 May, the tanager readily consumed mealworms and the following day ate several earthworms, including a nightcrawler. When released from the cage in the room, the bird flew normally and perched on the outstretched wing of a mounted Saw-whet Owl and then on the crown of a mounted White Pelican. Its apparent strength in making short flights suggested that it was ready to be returned to the wild.

An aluminum band (1501 38 292) had been placed on its left leg 16 May and the bird was released just north of Riding Mountain National Park, southeast of Dauphin, on the evening of 17 May. It flew to the top of a tall aspen, then launched off to the southwest and was lost from view by obstructing trees. When located three minutes later it was standing on a worked field about 150 m from where it took off. I approached the bird on foot and, when I was 30 m from it, it flew powerfully for 60 m and perched on the top of a Bur Oak. From there it flew 100 m south and landed again on the field.

The tanager made several short flights of 5 to 20 m before it flew from the field and disappeared into an aspen bluff where it sang. It was not seen again.

It is unknown whether the bird had a minor injury or was exhausted just prior to its capture by Kostuchuk. Surely it was in better condition when released two days later. However, its tendency to land on the ground without apparent foraging behaviour seemed peculiar.

Summer Tanagers winter mainly from Mexico to Bolivia and breed as far north as southern Missouri. The species has a reputation for overshooting its breeding range in the spring.[1] This would be especially true of inexperienced first-year birds making their initial northern migration as was the case with this bird.

I thank Bob Kostuchuk for his thoughtfulness in bringing the Summer Tanager to me.

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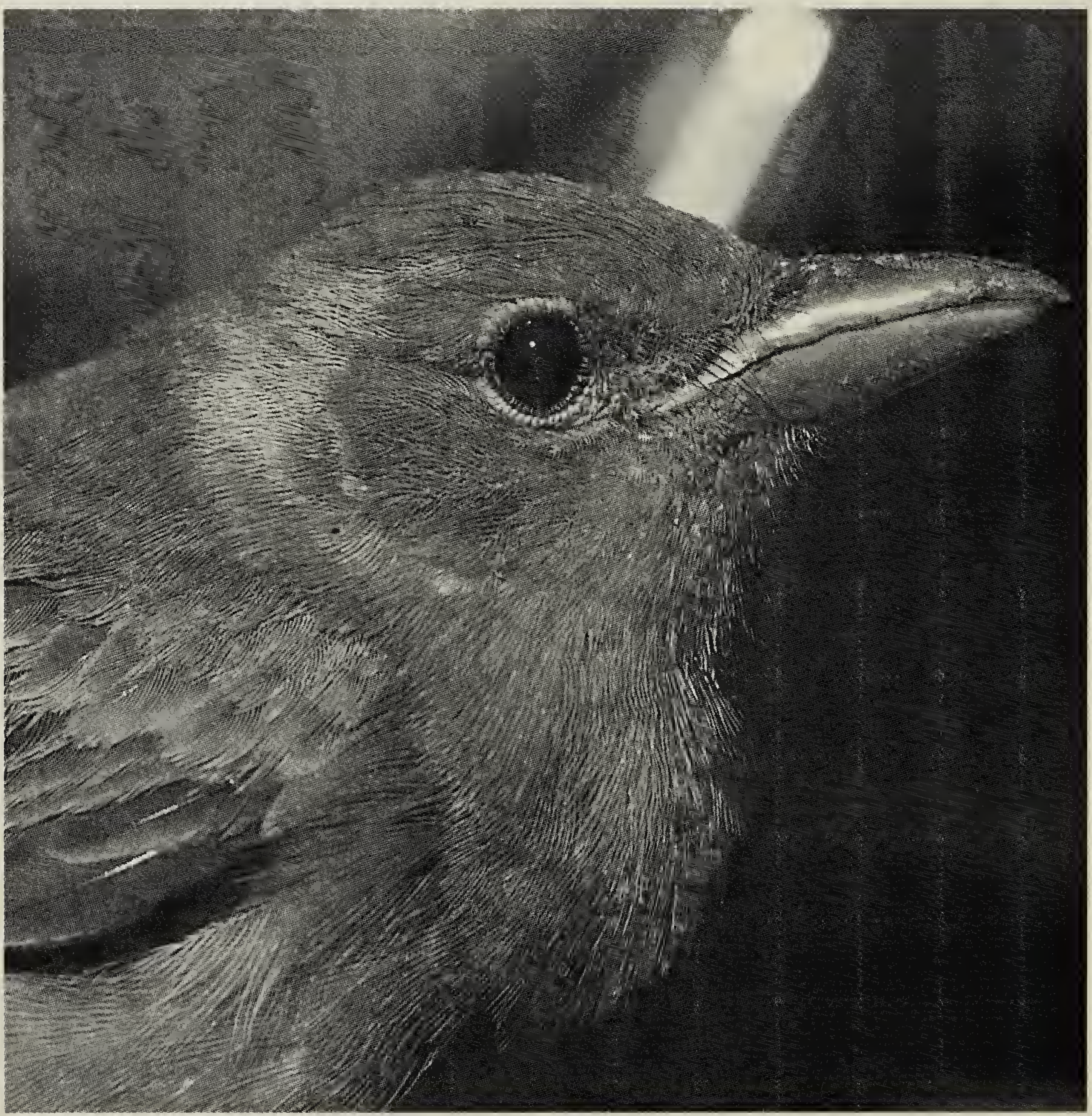


*Summer Tanager, Dauphin, Manitoba, May 1990. William J. Walley*

# BLUEBIRD NESTBOXES: UNUSUAL DESIGNS

RONALD A. BITTNER, Box 97, Abernethy, Saskatchewan. S0A 0A0

I started operating a bluebird trail in the Abernethy area in 1984, and have been using paired nestboxes since 1988 to reduce competition between Tree Swallows and Mountain Bluebirds. Paired nestboxes have worked well, but I had previously wondered if competition could be reduced through nestbox design. If two styles of boxes were provided, one favoured by bluebirds and one by swallows, this would reduce competition. In order to test the nestbox preferences of swallows and bluebirds, 10 different styles of nestboxes were built. Four were fairly conventional boxes, but with varying dimensions; they will be referred to as standard boxes. The other six were quite unusual in that they had more than one entrance; they will be called test boxes. There have been several boxes of each style used, for a total of 66. Data will be presented which show that bluebirds have favoured the test boxes, and swallows the standard boxes.

This experiment started with the assumption that standard boxes are the best choice for swallows. Some other design would be sought that would appeal to bluebirds. The considerations that went into the design will now be discussed. Bluebirds have two nesting characteristics which are rarely, if ever, shared by swallows. Firstly, bluebirds do not always nest in a cavity. Occasionally, they select a more open environmental such as a ledge on the exterior or interior of a building. Therefore the test boxes were designed to be less confining, by having entrances on two, three or four sides, and by using wide slots instead of round holes. Secondly, bluebirds sometimes choose a nesting site where they must fly upward through an opening to reach the nest. I once observed a bluebird flying upward through a large hole in the soffit of a building, apparently going to a nest. On another occasion, a bluebird nested in a farm implement where it had to fly upward through a 5-inch-square hole to reach the nest. In the test boxes this factor was approximated by concealing the entrances under the overhanging roof.

The first test boxes were built in 1987. They were remodelled in 1989; the reason will be discussed later. They had entrances on all four sides, and cottage style roofs overhanging the entrances. They are illustrated in the upper half of Figure 1. The corner view shows that the boxes were very open. The sloping roof is omitted for simplicity. The cross section shows how the roof partly concealed the openings. A photograph of one of these boxes appeared in an earlier *Blue Jay.*[1] Results with these boxes were encouraging and led to the construction of boxes with three openings and two openings. Most of these boxes were readily accepted by bluebirds.

Nesting results are presented in

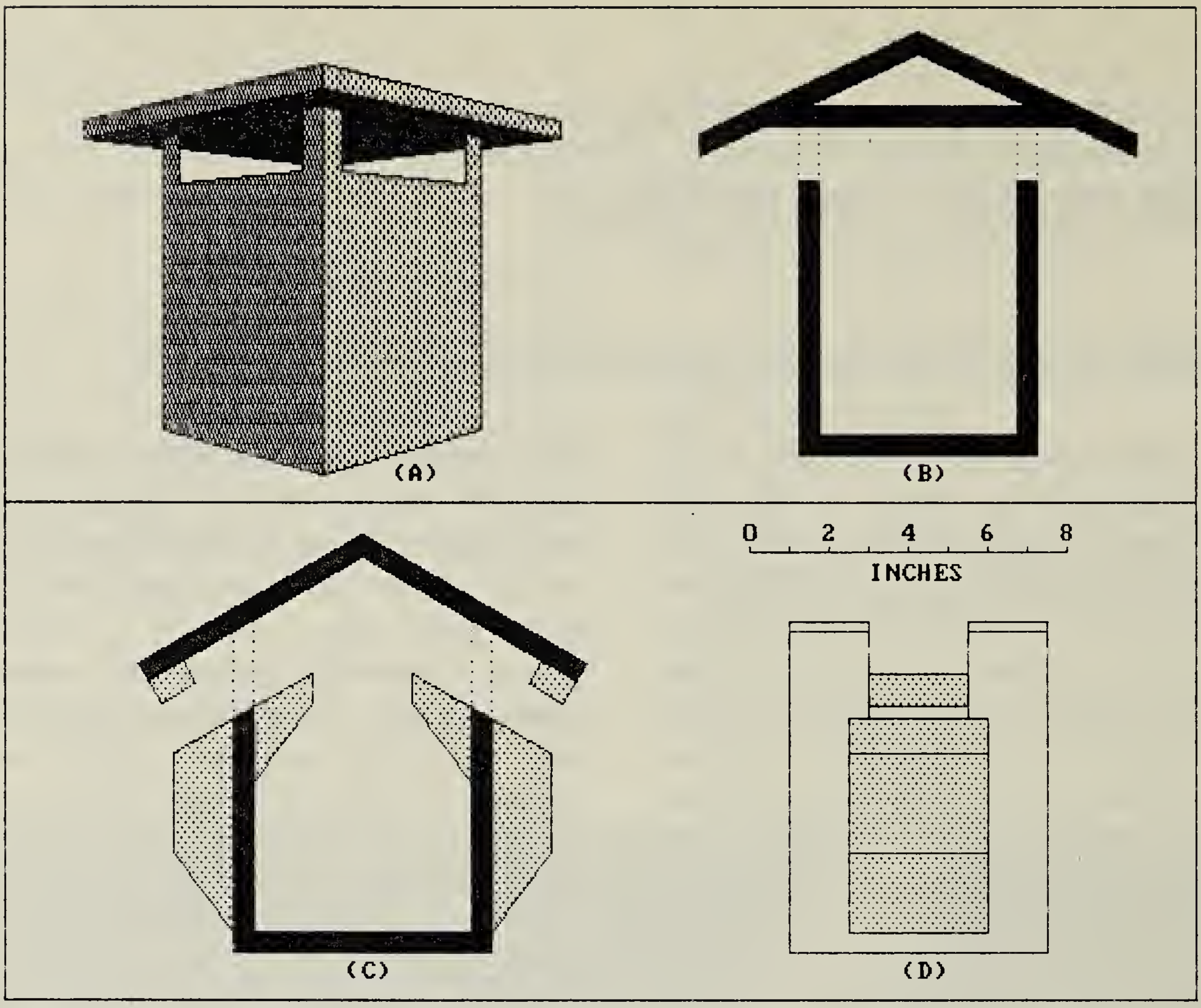
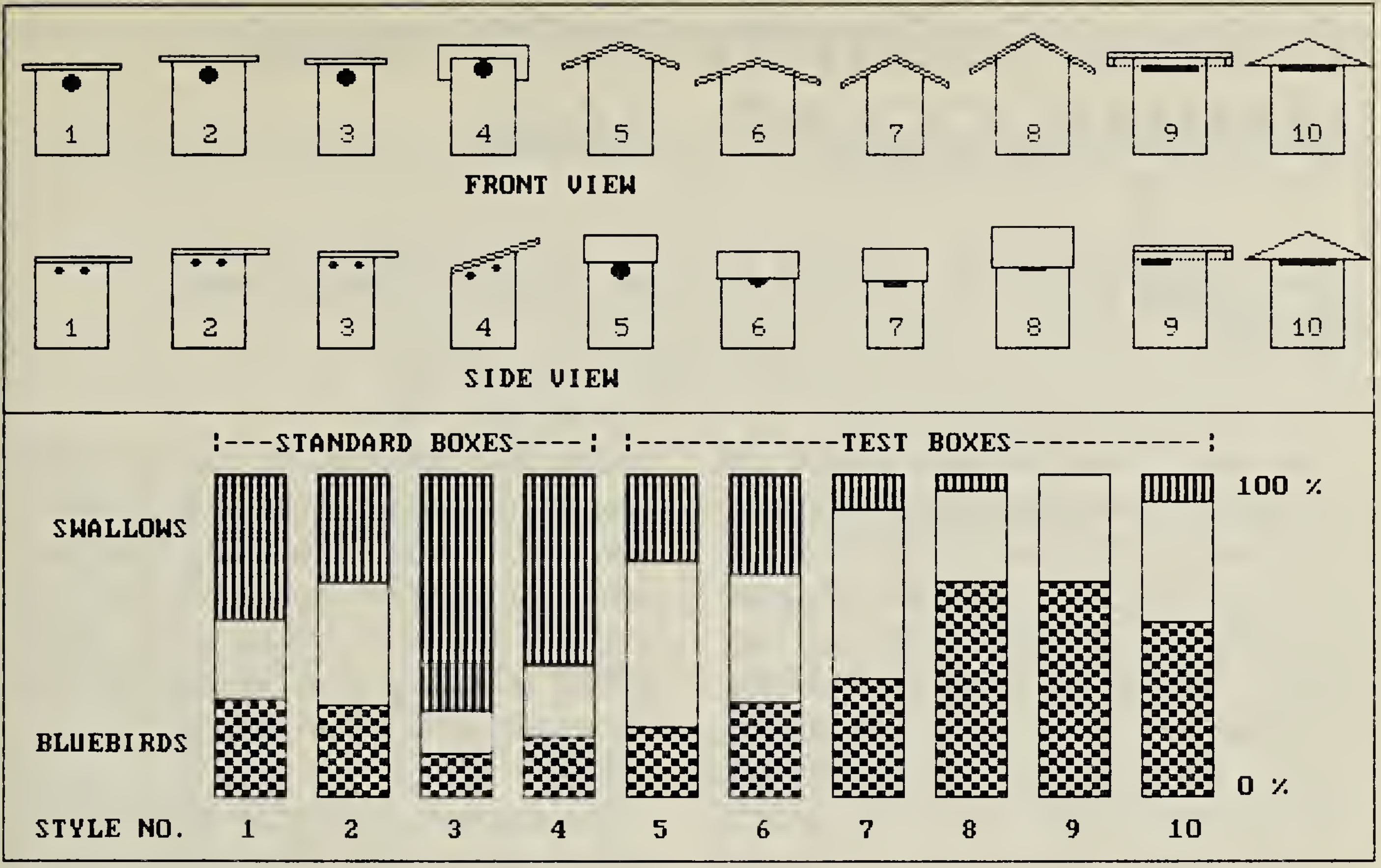


Figure 1. Top: experimental bluebird nestbox with four entrances; (A) corner view without sloping roof; (B) cross section with roof. Bottom: bluebird nestbox with two entrances; (C) front view cross section; (D) side view without roof.

Figure 2. The upper part of the figure shows the 10 nestbox styles. The first four are standard boxes, and the last six are test boxes. The earliest test design is called style 10 in this illustration. The lower part of the figure gives the results. Bluebird occupancy rate is given by the length of the checked bar, and the swallow rate by the length of the striped bar. The white bar represents other species or unused boxes. It can be seen that bluebirds have generally favoured the test boxes and swallows the standard boxes. Do bluebirds like the test boxes because of the extra openings or the concealed openings? This experiment does not provide a definite answer, but suggests that both factors contribute.

The illustrations discussed so far show the boxes as first constructed. They have since been modified at least twice, in an attempt to overcome predation problems. Raccoon predation in 1989 resulted in bluebird and swallow losses of 75%, and in 1990 losses of 50%. It should be noted that losses were equally severe in the standard and test boxes. It was apparent that something should be done to make all the boxes safer. Since this would be a difficult task for boxes with many openings, styles 9 and 10 were converted to two openings from three and four respectively. At the same time, various pieces were added to the inside and outside of all the boxes in the hope that they would prevent raccoons reaching down to the nests. There was no raccoon predation in 1991 and 1992, but it is not known if this was due to the modifications to the boxes or to the lack of raccoon activity.



| Nest Box Results | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of first nestings | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
| Swallows | 27 | 5 | 38 | 17 | 4 | 5 | 2 | 1 | 0 | 2 | 101 |
| Other species & empty | 15 | 6 | 7 | 6 | 8 | 6 | 9 | 6 | 5 | 7 | 75 |
| Bluebirds | 18 | 4 | 7 | 5 | 3 | 4 | 6 | 13 | 10 | 11 | 81 |
| Total (box-years) | 60 | 15 | 52 | 28 | 15 | 15 | 17 | 20 | 15 | 20 | 257 |

Figure 2. Bluebird and swallow occupancy rates for 10 nestbox styles, based on 81 bluebird and 101 swallow nestings from 1988 to 1992.

In addition to the box factors discussed so far, two other factors, size and depth, were tested. Size refers to the inside floor dimensions and ranged from 4.5 to 5.5 inches. Depth is the inside measure from the bottom of the entrance to the floor. This ranged from 5.5 to 7.0 inches. Bluebirds have favoured the larger size, and swallows the smaller size. Depth was not a significant factor for either species within the range tested.

One of the most successful test boxes is style 8. The lower part of Figure 1 shows a box which is similar to the remodelled version of style 8. Sloping entrance passages are created by blocks added to the interior and exterior of the side walls. The strips attached to the edges of the roof control the size of the entrances which are 1.25 inches deep. The entrance passages are wide and deep enough to allow easy access by a bluebird once it is past the restriction. The slope and length of the passages might prevent a predator reaching down to a nest. This type of nestbox might interest birders who have tried unsuccessfully to attract bluebirds, or who have experienced raccoon predation in their boxes.

1. BITTNER, R. A. 1988. Bluebirds at Abernethy: history and 1988 results. *Blue Jay* 46:215-218.

# SASKATCHEWAN CHRISTMAS MAMMAL COUNT - 1992

Compiled by WAYNE C. HARRIS, Box 414, Raymore, Saskatchewan.
S0A 3J0

As with Christmas bird counts the number of mammal counts dropped from last year's record high of 82 to 69. The number of species recorded on these counts dropped from last year's high of 44 to a more normal 36. Species which have appeared on most of the counts in the past but which were absent from this year's count were Richardson's Ground Squirrel and Northern Pocket Gopher (undoubtedly due to the very cold weather). Woodland Caribou and American Marten were also absent.

A single new species was recorded on this year's count. An American Water Shrew was found on the snow covered ice adjacent to open water on the Waskesiu River in Prince Albert National Park. This is within the normal range of this species but it is rarely seen as it frequents the edges of fast flowing streams and is usually under the overhanging ice of the stream edge during the winter months.

Other rarely reported species include Lynx and Bobcat both from the Skull Creek count where tracks were seen; Eastern Cottontail on the Estevan count and Swift Fox from the Govenlock count.

With 97% of the counts having White-tailed Deer, they were the most common and the most frequently encountered species. Red Fox at 62% and Coyote at 58% were the next most frequent species. Hare populations appear to be remaining low with White-tailed Jack Rabbit with only 52% and Snowshoe Hare with 49% occurrences.

For weather, coverage and participants please refer to the Christmas Bird Count found elsewhere in this issue. Numbers appearing before the count location name in the tables refer to the location of the count on the map included with the bird count; some columns are left blank because no mammal counts were taken at those locations. In the tables a numeral alone indicates that the animals were actually seen, while a letter preceding the number indicates that the numbers were inferred by the means defined. A letter alone indicates that the species was present but it was either impossible to estimate numbers or no attempt was made to do so.

T = tracks
L = active lodge or hut
D = dead animal found
d = fresh diggings found
S = smell or odour
H = heard
+ = present during the count period (Dec. 17 to Jan. 3) but not found on count day.

Table 1-1. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

| | LOCATION AND DATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 1. ABERNETHY-KAT. L 19 Dec. 1992 | 2. ARMIT 24 Dec. 1992 | 3. BETHUNE 03 Jan. 1993 | 4. BIGGAR 30 Dec. 1992 | 5. BIG MUDDY LAKE 03 Jan. 1993 | 6. BIRCH HILLS 01 Jan. 1993 | 7. BROMHEAD 02 Jan. 1993 | 8. CABRI 25 Dec. 1992 | 9. CANDLE LAKE 03 Jan. 1993 | 10. CLARK'S CROSSING 19 Dec. 1992 | 11. CRAVEN 19 Dec. 1992 | 12. CROOKED LAKE 03 Jan. 1993 |
| MASKED SHREW | | | | | | | | | | | | |
| AMERICAN WATER SHREW | | | | | | | | | | | | |
| SHORT-TAILED SHREW | | | | | | | | | | | | |
| SHREW species | | | | | | | | | | | 1 | |
| LITTLE BROWN BAT | | | | | | | | | | | | |
| EASTERN COTTONTAIL | | | | | | | | | | | | |
| NUTTALL'S COTTONTAIL | | | | | 1 | | | 1 | | | | |
| SNOWSHOE HARE | 1 | T | | 5 | | T1 | | 5 | | T13 | T16 | T |
| WHITE-TAILED JACK RABBIT | | T | | T15 | T | T4 | T14 | | | 3+T14 | T12 | |
| RICHARDSON'S GROUND SQUIRREL | | | | | | | | | | | | |
| THIRTEEN-LINED GROUND SQUIRREL | | | | | | | | | | | | |
| BLACK-TAILED PRAIRIE DOG | | | | | | | | | | | | |
| GREY SQUIRREL | | | | | | | | | | | | |
| FOX SQUIRREL | | | | | | | | | | | | |
| AMERICAN RED SQUIRREL | + | 7 | | | | T1 | | | 3 | | | 1 |
| NORTHERN FLYING SQUIRREL | | | | | | | | | | | | |
| NORTHERN POCKET GOPHER | | | | | | | | | | | | |
| AMERICAN BEAVER | | L2 | | | | | | | | | | |
| DEER MOUSE | | | | | T1 | | | | | | T9 | |
| GAPPER'S RED-BACKED VOLE | | | | | | | | | | | | |
| MUSKRAT | | | | | | | | | | | | |
| MEADOW VOLE | | | | | | | | | | | | T |
| VOLE species | | | | T7 | | | | | | | | |
| MOUSE species | | | | T5 | | T8 | | | | | | |
| NORWAY RAT | | | | | | | | | | | | |
| HOUSE MOUSE | | | | | | | | | | | | |
| AMERICAN PORCUPINE | | 1 | | | T2 | | | | | | 1 | |
| COYOTE | | T4 | | 10 | 2 | 1+T5 | 2 | | 1 | T1 | T6 | |
| WOLF | | T3 | | | | | | | | | | |
| RED FOX | + | T2 | | T4 | 1 | T7 | 1 | | | T1 | T8 | 2 |
| SWIFT FOX | | | | | | | | | | | | |
| RACCOON | | | | | | | | | | | | |
| AMERICAN MARTEN | | | | | | | | | | | | |
| FISHER | | | | | | | | | | | | |
| ERMINE | | T2 | | | | T2 | | | | | | |
| LONG-TAILED WEASEL | | | | | | T2 | | | | | T2 | |
| LEAST WEASEL | | | | | | T2 | | | | | | |
| WEASEL species | | | | | T1 | | | | | T3 | | T4 |
| AMERICAN MINK | | T2 | | | | T1 | | | | | | T1 |
| AMERICAN BADGER | | | | | | | | | | | | |
| STRIPED SKUNK | | | | | | | | | | | | |
| RIVER OTTER | | | | | | | | | | | | |
| LYNX | | | | | | | | | | | | |
| BOBCAT | | | | | | | | | | | | |
| WOODLAND CARIBOU | | | | | | | | | | | | |
| MULE DEER | | | + | 1 | 22 | | | | | 6 | | |
| WHITE-TAILED DEER | + | 4 | + | 4 | 29 | T3 | 23 | + | 3 | 3+T16 | 21 | T |
| DEER species | | | | | | | | | | | T26 | |
| MOOSE | | T2 | | | | | | | | | | |
| AMERICAN ELK | | T3 | | | | | | | | | | |
| PRONGHORN | | | | | 92 | | 31 | | | | | |
| TOTAL SPECIES | 4 | 13 | 2 | 8 | 10 | 11 | 5 | 3 | 3 | 7 | 10 | 7 |

## Table 1.2. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

| | LOCATION AND DATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 13. DILKE 28 Dec. 1992 | 14. DUVAL 29 Dec. 1992 | 15. EDAM 26 Dec. 1992 | 16. ENDEAVOUR 25 Dec. 1992 | 17. ESTEVAN 24 Dec. 1992 | 18. FENTON 02 Jan. 1993 | 19. FIFE LAKE 03 Jan. 1993 | 20. FORT QU'APPELLE 21 Dec. 1992 | 21. FORT WALSH 20 Dec. 1992 | 22. GARDINER DAM 22 Dec. 1992 | 23. GOOD SPIRIT LAKE 01 Jan. 1993 | 24. GOVENLOCK 21 Dec. 1992 |
| MASKED SHREW | | | | | | | | | | | | |
| AMERICAN WATER SHREW | | | | | | | | | | | | |
| SHORT-TAILED SHREW | | | | | | | | | | | | |
| SHREW species | | | | | | | | | T1 | | | |
| LITTLE BROWN BAT | | | | | | | | | | | | |
| EASTERN COTTONTAIL | | | | | 2 | | | | | | | |
| NUTTALL'S COTTONTAIL | | | | | | | | | 1 | T2 | | 7 |
| SNOWSHOE HARE | | | | | | + | | + | T1 | T2 | T20 | |
| WHITE-TAILED JACK RABBIT | | | | | T2 | | | + | T11 | T7 | T22 | 2 |
| RICHARDSON'S GROUND SQUIRREL | | | | | | | | | | | | |
| THIRTEEN-LINED GROUND SQUIRREL | | | | | | | | | | | | |
| BLACK-TAILED PRAIRIE DOG | | | | | | | | | | | | |
| GREY SQUIRREL | | | | | | | | | | | | |
| FOX SQUIRREL | | | | | T2 | | | | | | | |
| AMERICAN RED SQUIRREL | | | | 1 | | | | 3 | 41 | | T3 | |
| NORTHERN FLYING SQUIRREL | | | | | | | | | | | 1 | |
| NORTHERN POCKET GOPHER | | | | | | | | | | | | |
| AMERICAN BEAVER | | | | | | | | + | | | | |
| DEER MOUSE | | | | | | | | 1 | | | | |
| GAPPER'S RED-BACKED VOLE | | 1 | | | | | | | | | 1 | |
| MUSKRAT | | | | | | | | | | | L1 | |
| MEADOW VOLE | | | | | | | | + | 1 | | | |
| VOLE species | | | | | | | | | | T11 | | T10 |
| MOUSE species | | T2 | | | | | | | T8 | | | T |
| NORWAY RAT | | | | | | | | | | | | |
| HOUSE MOUSE | | | | | | | | + | | | | |
| AMERICAN PORCUPINE | | T1 | | | | | | | 1 | | T3 | T1 |
| COYOTE | | T5 | | T1 | | | | + | 16 | 4 | 3 | 12 |
| WOLF | | | | | | | | | | | | |
| RED FOX | | | | | T1 | | | + | 2 | T2 | T2 | 2 |
| SWIFT FOX | | | | | | | | | | | | + |
| RACCOON | | | | | | | | | | | | |
| AMERICAN MARTEN | | | | | | | | | | | | |
| FISHER | | | | | | | | | | | | |
| ERMINE | | | | | | | | | | | T5 | |
| LONG-TAILED WEASEL | | | | | | | | | | | T1 | T1 |
| LEAST WEASEL | | | | | | | | | | | | |
| WEASEL species | | | | | | | | | T1 | T2 | | |
| AMERICAN MINK | | | | | | | | + | T1 | | | |
| AMERICAN BADGER | | | | | | | | | | | | d2 |
| STRIPED SKUNK | | | | | | | | | | | | |
| RIVER OTTER | | | | | | | | | | | | |
| LYNX | | | | | | | | | | | | |
| BOBCAT | | | | | | | | | | | | |
| WOODLAND CARIBOU | | | | | | | | | | | | |
| MULE DEER | | | | | | | | | 107 | 14 | | 121 |
| WHITE-TAILED DEER | | T3 | | T9 | 2 | | | + | 80 | 47 | T37 | 35 |
| DEER species | | | | | | | | | | | | |
| MOOSE | | | | T1 | | | | | T1 | | T1 | |
| AMERICAN ELK | | | | | | | | | T15 | | | |
| PRONGHORN | | | | | | | | | | | | 116 |
| TOTAL SPECIES | 0 | 5 | 0 | 4 | 5 | 1 | 0 | 11 | 16 | 9 | 13 | 13 |

## Table 1.3. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

| | LOCATION AND DATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 25. G. CTR.-PIERCELAND 26 Dec. 1992 | 26. GRASSLANDS N.P. 19 Dec. 1992 | 27. HUDSON BAY 02 Jan. 1993 | 28. HUMBOLDT 26 Dec. 1992 | 29. INDIAN HEAD 30 Dec. 1992 | 30. KAMSACK 26 Dec. 1992 | 31. KELVINGTON 02 Jan. 1993 | 32. KENASTON 26 Dec. 1992 | 33. KINDERSLEY 03 Jan. 1993 | 34. KINLOCH 03 Jan. 1993 | 35. KUTAWAGAN LAKE 02 Jan. 1993 | 36. LARONGE 02 Jan. 1993 |
| MASKED SHREW | | | | | | | | | | | | |
| AMERICAN WATER SHREW | | | | | | | | | | | | |
| SHORT-TAILED SHREW | | | | | | | | | | | | |
| SHREW species | | | | | | | | | | | | |
| LITTLE BROWN BAT | | | | | | | | | | | | |
| EASTERN COTTONTAIL | | | | | | | | | | | | |
| NUTTALL'S COTTONTAIL | | 6 | | | | | | | | | | |
| SNOWSHOE HARE | T13 | | | 1 | | 26 | T4 | | | | | T2 |
| WHITE-TAILED JACK RABBIT | | 1 | | T1 | 5+T12 | | T2 | | | | T | |
| RICHARDSON'S GROUND SQUIRREL | | | | | | | | | | | | |
| THIRTEEN-LINED GROUND SQUIRREL | | | | | | | | | | | | |
| BLACK-TAILED PRAIRIE DOG | | | | | | | | | | | | |
| GREY SQUIRREL | | | | | | | | | | | | |
| FOX SQUIRREL | | | | | | | | | | | | |
| AMERICAN RED SQUIRREL | 1 | | | | 1 | | | | | | | 3 |
| NORTHERN FLYING SQUIRREL | | | | | | | | | | | | |
| NORTHERN POCKET GOPHER | | | | | | | | | | | | |
| AMERICAN BEAVER | | | | | | | | | | | | |
| DEER MOUSE | | T | | | | | | | | | | |
| GAPPER'S RED-BACKED VOLE | | | | | | | | | | | | |
| MUSKRAT | | | | | | | | | | | | |
| MEADOW VOLE | | 10 | | | | | | | | | | T1 |
| VOLE species | | | | | | | | | | | | |
| MOUSE species | | | | | | | | T | | | | |
| NORWAY RAT | | | | | | | | | | | | |
| HOUSE MOUSE | | | | | | | | | | | | |
| AMERICAN PORCUPINE | | 6 | | | | | | | | | | |
| COYOTE | | 4 | | | + | 7 | + | | | | 1 | T5 |
| WOLF | | | | | | | | | | | | |
| RED FOX | + | | | | + | | T1 | T | | | 1 | T3 |
| SWIFT FOX | | | | | | | | | | | | |
| RACCOON | | | | | | | | | | | | |
| AMERICAN MARTEN | | | | | | | | | | | | |
| FISHER | | | | | | | | | | | | |
| ERMINE | | | | | | | | | | | | T3 |
| LONG-TAILED WEASEL | | | | | | | T1 | | | | | |
| LEAST WEASEL | | | | | | | T1 | | | | | |
| WEASEL species | | | | | T2 | | | | | | T | |
| AMERICAN MINK | | | | | | | | | | | | |
| AMERICAN BADGER | | | | | | | | | | | | |
| STRIPED SKUNK | | | | | + | | | | | | | |
| RIVER OTTER | | | | | | | | | | | | |
| LYNX | | | | | | | | | | | | |
| BOBCAT | | | | | | | | | | | | |
| WOODLAND CARIBOU | | | | | | | | | | | | |
| MULE DEER | | 111 | | | | | | | 9 | | | |
| WHITE-TAILED DEER | T15 | 67 | | T3 | + | 28 | 6 | T | | | | |
| DEER species | | | | | | | | | | | T | |
| MOOSE | | | | | | 2 | | | | | | |
| AMERICAN ELK | | | | | | 50 | | | | | | |
| PRONGHORN | | 444 | | | | | | | | | | |
| TOTAL SPECIES | 4 | 9 | 0 | 3 | 7 | 5 | 7 | 3 | 1 | 0 | 5 | 6 |

## Table 1.4. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

| | LOCATION AND DATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 37. LAST MTN. LAKE 26 Dec. 1992 | 38. LEADER 31 Dec. 1992 | 39. LIVELONG 02 Jan. 1993 | 40. LOON LAKE 31 Dec. 1992 | 41. LOVE-TORCH RIVER 28 Dec. 1992 | 42. LUSELAND 29 Dec. 1992 | 43. MACDOWALL 01 Jan. 1993 | 44. MARSDEN 28 Dec. 1992 | 45. MEADOW LAKE 27 Dec. 1992 | 46. MELFORT 19 Dec. 1992 | 47. MELVILLE 25 Dec. 1992 | 48. MISSINIPE 03 Jan. 1993 |
| MASKED SHREW | | | | | | | | | | | | |
| AMERICAN WATER SHREW | | | | | | | | | | | | |
| SHORT-TAILED SHREW | | | | | | | | | | | | |
| SHREW species | | | | | | | | | | | | |
| LITTLE BROWN BAT | | | | | | | | | | | | |
| EASTERN COTTONTAIL | | | | | | | | | | | | |
| NUTTALL'S COTTONTAIL | | | | | | | | | | | | |
| SNOWSHOE HARE | | | | | | | T8 | 1 | | | | |
| WHITE-TAILED JACK RABBIT | T | 2 | | | | + | + | | | | | |
| RICHARDSON'S GROUND SQUIRREL | | | | | | | | | | | | |
| THIRTEEN-LINED GROUND SQUIRREL | | | | | | | | | | | | |
| BLACK-TAILED PRAIRIE DOG | | | | | | | | | | | | |
| GREY SQUIRREL | | | | | | | | | | | | |
| FOX SQUIRREL | | | | | | | | | | | | |
| AMERICAN RED SQUIRREL | | | | | | | 1 | | | | | |
| NORTHERN FLYING SQUIRREL | | | | | | | | | | | | |
| NORTHERN POCKET GOPHER | | | | | | | | | | | | |
| AMERICAN BEAVER | | | | | | | | | | | | |
| DEER MOUSE | | | | | | | | | | | | |
| GAPPER'S RED-BACKED VOLE | | | | | | | 1 | | | | | |
| MUSKRAT | | | | | | | | | | | | |
| MEADOW VOLE | | | | | | | | | | | | |
| VOLE species | | | | | | | | | | | | |
| MOUSE species | | 22 | | | | | T6 | | | T | | |
| NORWAY RAT | | | | | | | | | | | | |
| HOUSE MOUSE | | | | | | | | | | | | |
| AMERICAN PORCUPINE | T | 1 | | | | | | | | | | |
| COYOTE | 3 | 2 | | | + | + | T4 | | | | | |
| WOLF | | | | | | | | | | | | |
| RED FOX | T | | | | T3 | + | T5 | | | T | | |
| SWIFT FOX | | | | | | | | | | | | |
| RACCOON | | | | | | | T2 | | | | | |
| AMERICAN MARTEN | | | | | | | | | | | | |
| FISHER | | | | | | | | | | | | |
| ERMINE | | | | | | | | | | | | |
| LONG-TAILED WEASEL | | | | | | | | | | | | |
| LEAST WEASEL | | | | | | | T6 | | | | | |
| WEASEL species | T | | | | | | T2 | | | 1 | + | |
| AMERICAN MINK | | | | | | | | | | | | |
| AMERICAN BADGER | | | | | | | | | | | | |
| STRIPED SKUNK | | | | | | | | | | | | |
| RIVER OTTER | | | | | | | | | | | | |
| LYNX | | | | | | | | | | | | |
| BOBCAT | | | | | | | | | | | | |
| WOODLAND CARIBOU | | | | | | | | | | | | |
| MULE DEER | | 27 | | | | 5 | | 5 | | | | |
| WHITE-TAILED DEER | 4 | 13 | | 2 | 2 | | 1+T20 | 20 | | | 7 | |
| DEER species | | | | | | | | | | | | |
| MOOSE | | | | | | | | | | | | |
| AMERICAN ELK | | | | | | | | | | | | |
| PRONGHORN | | | | | | | | | | | | |
| TOTAL SPECIES | 6 | 6 | 0 | 1 | 3 | 4 | 11 | 3 | 0 | 3 | 2 | 0 |

## Table 1.5. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

| | LOCATION AND DATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 49. MOOSE JAW 26 Dec. 1992 | 50. MOOSE MOUNTAIN 17 Dec. 1992 | 51. NICOLLE FLATS 03 Jan. 1993 | 52. NIPAWIN 03 Jan. 1993 | 53. PIKE LAKE 02 Jan. 1993 | 54. PORCUPINE PLAIN 28 Dec. 1992 | 55. PRINCE ALBERT (A) 22 Dec. 1992 | 56. PRINCE ALBERT (B) 20 Dec. 1992 | 57. PRINCE ALBERT N.P. 20 Dec. 1992 | 58. QU'APPELLE VAL. D. 20 Dec. 1992 | 59. RAYMORE 25 Dec. 1992 | 60. REGINA 26 Dec. 1992 |
| MASKED SHREW | | | | | | | | | | | 1 | |
| AMERICAN WATER SHREW | | | | | | | | | + | | | |
| SHORT-TAILED SHREW | | | | | | | | | | | | |
| SHREW species | | | | | | | | | | | | |
| LITTLE BROWN BAT | | | | | | | | | | | | |
| EASTERN COTTONTAIL | | | | | | | | | | | | |
| NUTTALL'S COTTONTAIL | | | | | | | | | | | | |
| SNOWSHOE HARE | | | | | T5 | | | | T8 | 1+T | T5 | 2 |
| WHITE-TAILED JACK RABBIT | | | D1 | | T5 | | | | | | T3 | 3 |
| RICHARDSON'S GROUND SQUIRREL | | | | | | | | | | | | |
| THIRTEEN-LINED GROUND SQUIRREL | | | | | | | | | | | | |
| BLACK-TAILED PRAIRIE DOG | | | | | | | | | | | | |
| GREY SQUIRREL | | | | | | | | | | | | |
| FOX SQUIRREL | | | | | | | | | | | | |
| AMERICAN RED SQUIRREL | 2 | 3 | | | | | | 1 | 1+T5 | | | 1 |
| NORTHERN FLYING SQUIRREL | | | | | | | | | | | | |
| NORTHERN POCKET GOPHER | | | | | | | | | | | | |
| AMERICAN BEAVER | | | | | | | | | | | L1 | |
| DEER MOUSE | | | | | 1 | | | | T1 | | 2 | |
| GAPPER'S RED-BACKED VOLE | | | | | | | | | | | 1 | |
| MUSKRAT | | | | | | | | | | | L1 | L2 |
| MEADOW VOLE | | | | | | | | | | | 2 | |
| VOLE species | | | | | | | | | | | T2 | |
| MOUSE species | | | | | | | | | | | T7 | |
| NORWAY RAT | | | | | | | | | | | | |
| HOUSE MOUSE | | | | | | | | | | | 2 | |
| AMERICAN PORCUPINE | | | 1 | | | | | | | | 2 | |
| COYOTE | | | | | | | | | T1 | 3+2T | 4 | |
| WOLF | | | | | | | | | T2 | | | |
| RED FOX | | 1 | 1 | | | | | | 3+6T | 1 | 1 | 8 |
| SWIFT FOX | | | | | | | | | | | | |
| RACCOON | | | | | | | | | | | | |
| AMERICAN MARTEN | | | | | | | | | | | | |
| FISHER | | | | | | | | | 1 | | | |
| ERMINE | | | | | | | | | | | | |
| LONG-TAILED WEASEL | | | | | | | | | | | + | |
| LEAST WEASEL | | | | | | | | | | | | |
| WEASEL species | | | | | | | | | | | T5 | |
| AMERICAN MINK | | | | | | | | | 1 | | | |
| AMERICAN BADGER | | | | | | | | | | | | |
| STRIPED SKUNK | | | | | | | | | | | | |
| RIVER OTTER | | | | | | | | | T4 | | | |
| LYNX | | | | | | | | | | | | |
| BOBCAT | | | | | | | | | | | | |
| WOODLAND CARIBOU | | | | | | | | | | | | |
| MULE DEER | | | 6 | | | | | | | 5 | | |
| WHITE-TAILED DEER | 3 | 8 | 39 | | | | | 9 | T8 | 15 | 7 | 13 |
| DEER species | | | | | 2 | | | | T1 | | | T |
| MOOSE | | | | | | | | | T2 | | | |
| AMERICAN ELK | | | | | | | | | 3+45T | | | |
| PRONGHORN | | | | | | | | | | | | |
| TOTAL SPECIES | 2 | 3 | 5 | 0 | 4 | 0 | 0 | 2 | 14 | 5 | 17 | 7 |

## Table 1.6. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

| | LOCATION AND DATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 61. REGINA BEACH 03 Jan. 1993 | 62. ROUND LAKE 26 Dec. 1992 | 63. SASKATOON 26 Dec. 1992 | 64. SCOTT 03 Jan. 1993 | 65. SKULL CREEK 26 Dec. 1992 | 66. SNOWDEN 22 Dec. 1992 | 67. SOMME-NEELY LAKE 17 Dec. 1992 | 68. SPALDING 03 Jan. 1993 | 69. SPINNEY HILL 02 Jan. 1993 | 70. SPRING VALLEY 25 Dec. 1992 | 71. SPRUCE HOME 02 Jan. 1993 | 72. SQUAW RAPIDS 17 Dec. 1992 |
| MASKED SHREW | | | | | | | | | | | | |
| AMERICAN WATER SHREW | | | | | | | | | | | | |
| SHORT-TAILED SHREW | | | | | | | | | | | | |
| SHREW species | | | | | T | | | | T | | | |
| LITTLE BROWN BAT | | | | | | | | | | | | |
| EASTERN COTTONTAIL | | | | | | | | | | | | |
| NUTTALL'S COTTONTAIL | | | | | 6 | | | | | | | |
| SNOWSHOE HARE | 1 | T1 | 2+21T | | | T9 | | T | T | | | T19 |
| WHITE-TAILED JACK RABBIT | 1 | T1 | | T7 | 11 | | | | | 2+T | | T |
| RICHARDSON'S GROUND SQUIRREL | | | | | | | | | | | | |
| THIRTEEN-LINED GROUND SQUIRREL | | | | | | | | | | | | |
| BLACK-TAILED PRAIRIE DOG | | | | | | | | | | | | |
| GREY SQUIRREL | | | | | | | | | | | | |
| FOX SQUIRREL | | | | | | | | | | | | |
| AMERICAN RED SQUIRREL | | | | | 2 | 2 | | | | | | 10 |
| NORTHERN FLYING SQUIRREL | | | | | | | | | | | | |
| NORTHERN POCKET GOPHER | | | | | | | | | | | | |
| AMERICAN BEAVER | | T1 | | | | | | | | | | L2 |
| DEER MOUSE | | | | | | | | | | | | |
| GAPPER'S RED-BACKED VOLE | | | | | | | | | | | | |
| MUSKRAT | | T1 | | | | | | | | | | |
| MEADOW VOLE | | | | | 1 | | | | | | | |
| VOLE species | | | | T7 | | | | T | | | | 1 |
| MOUSE species | | | | | T | T6 | | T | T | T | | T |
| NORWAY RAT | | | | | | | | | | | | |
| HOUSE MOUSE | | | | | | | | | | | | |
| AMERICAN PORCUPINE | T1 | | | 1 | 6 | | | | T | T | | T1 |
| COYOTE | T2 | | 1 | 2 | 7 | T7 | | | 2+T | 3 | | 2 |
| WOLF | | | | | | | | | | | | T1 |
| RED FOX | T3 | | 2 | | T | T2 | | | T | 1 | | 1 |
| SWIFT FOX | | | | | | | | | | | | |
| RACCOON | | | T | | | T1 | | | | | | |
| AMERICAN MARTEN | | | | | | | | | | | | |
| FISHER | | | | | | | | | | | | T |
| ERMINE | | | | | | | | | | | | |
| LONG-TAILED WEASEL | | T1 | | | + | | | | | | | |
| LEAST WEASEL | | | T | | | | | | | | | |
| WEASEL species | | | | | | T2 | | T | | | | T |
| AMERICAN MINK | | T1 | | | T | T2 | | | | | | |
| AMERICAN BADGER | | | | | 1 | | | | | | | |
| STRIPED SKUNK | | | | | | | | | | | | |
| RIVER OTTER | | | | | | | | | | | | |
| LYNX | | | | | T | | | | | | | |
| BOBCAT | | | | | T | | | | | | | |
| WOODLAND CARIBOU | | | | | | | | | | | | |
| MULE DEER | | | | | 23 | | | | | 8 | | |
| WHITE-TAILED DEER | 4+3T | | 11+15T | T5 | 43 | T24 | | T | 1+T | | + | 4 |
| DEER species | | | | | | | | | T | | | |
| MOOSE | | | | | | | | | T | | | T3 |
| AMERICAN ELK | | | | | | T3 | | | | | | T10 |
| PRONGHORN | | | | | T | | | | | | | |
| TOTAL SPECIES | 6 | 6 | 6 | 5 | 17 | 10 | 0 | 5 | 9 | 6 | 1 | 15 |

## Table 1.7. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

| | LOCATION AND DATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPECIES | 73. SWIFT CURRENT 02 Jan. 1993 | 74. TISDALE 30 Dec. 1992 | 75. TURTLE LAKE 26 Dec. 1992 | 76. VAL MARIE 03 Jan. 1993 | 77. WEYBURN 19 Dec. 1992 | 78. WHITE BEAR 02 Jan. 1993 | 79. WHITEWOOD 01 Jan. 1993 | 80. YORKTON 02 Jan. 1993 | | | | TOTAL COUNTS |
| MASKED SHREW | | | | | | | | | | | | 1 |
| AMERICAN WATER SHREW | | | | | | | | | | | | 1 |
| SHORT-TAILED SHREW | | | | | | | | | | | | 0 |
| SHREW species | | | | | | | | | | | | 4 |
| LITTLE BROWN BAT | | | | | | | | | | | | 0 |
| EASTERN COTTONTAIL | | | | | | | | | | | | 1 |
| NUTTALL'S COTTONTAIL | 1 | | | | | 4 | | | | | | 8 |
| SNOWSHOE HARE | | | | | + | | T | | | | | 34 |
| WHITE-TAILED JACK RABBIT | | | | 2 | 1 | | T | 1 | | | | 36 |
| RICHARDSON'S GROUND SQUIRREL | | | | | | | | | | | | 0 |
| THIRTEEN-LINED GROUND SQUIRREL | | | | | | | | | | | | 0 |
| BLACK-TAILED PRAIRIE DOG | | | | | | | | | | | | 0 |
| GREY SQUIRREL | | | | | | | | | | | | 0 |
| FOX SQUIRREL | | | | | + | | | | | | | 1 |
| AMERICAN RED SQUIRREL | | | | | | | 2 | | | | | 22 |
| NORTHERN FLYING SQUIRREL | | | | | | | | | | | | 1 |
| NORTHERN POCKET GOPHER | | | | | | | | | | | | 0 |
| AMERICAN BEAVER | | | | | | | | | | | | 5 |
| DEER MOUSE | | | | | | | | | | | | 7 |
| GAPPER'S RED-BACKED VOLE | | | | | | | | | | | | 4 |
| MUSKRAT | | | | | | | | | | | | 4 |
| MEADOW VOLE | | | | | | | | | | | | 7 |
| VOLE species | | | | | | | + | | | | | 8 |
| MOUSE species | | | | | | | T | | | | | 17 |
| NORWAY RAT | | | | | | | | | | | | 0 |
| HOUSE MOUSE | | | | | | | | | | | | 2 |
| AMERICAN PORCUPINE | | | | 1 | | | 1 | | | | | 20 |
| COYOTE | | | 2 | 7 | | | 4 | | | | | 40 |
| WOLF | | | | | | | | | | | | 3 |
| RED FOX | | | | 1 | 1 | + | 2 | | | | | 43 |
| SWIFT FOX | | | | | | | | | | | | 1 |
| RACCOON | | | | | | | | | | | | 3 |
| AMERICAN MARTEN | | | | | | | | | | | | 0 |
| FISHER | | | | | | | | | | | | 2 |
| ERMINE | | | | | | | | | | | | 4 |
| LONG-TAILED WEASEL | | | | | | | | | | | | 7 |
| LEAST WEASEL | | | | | | | | | | | | 4 |
| WEASEL species | | | | | | | + | | | | | 16 |
| AMERICAN MINK | | | | | | | | | | | | 9 |
| AMERICAN BADGER | | | | | | | | | | | | 2 |
| STRIPED SKUNK | | | | | | | | | | | | 1 |
| RIVER OTTER | | | | | | | | | | | | 1 |
| LYNX | | | | | | | | | | | | 2 |
| BOBCAT | | | | | | | | | | | | 1 |
| WOODLAND CARIBOU | | | | | | | | | | | | 0 |
| MULE DEER | + | | | | 4 | 56 | | | | | | 19 |
| WHITE-TAILED DEER | + | | 14 | 12 | 4 | | 11 | 4 | | | | 67 |
| DEER species | | | | | | | | | | | | 6 |
| MOOSE | | | 2 | | | | | | | | | 8 |
| AMERICAN ELK | | | 2 | | | | | | | | | 7 |
| PRONGHORN | | | | | | | | | | | | 5 |
| TOTAL SPECIES | 3 | 0 | 4 | 5 | 6 | 3 | 10 | 2 | | | | |

# COYOTE AND MAGPIE BEHAVIOUR AT WHITE-TAILED DEER CARCASSES

TIM BRACE, Group Site 308, Box 49, R.R. # 3, Saskatoon, Saskatchewan.
S7K 3J6

My mother and I shot two White-tailed Deer near our Pike Lake, Saskatchewan, home during the 1992 deer season. After processing the deer, the remnants (heads, skeletons and some meat) were deposited about 200 yards south of our house on 20 December.

Magpies found and scavenged the carcass on 21 December. Coyotes were not observed until 24 December, at which time four of them appeared.

Some intraspecies exclusion occurred, as only one coyote visited either carcass at any one time. The other coyotes remained about 20 yards away. After about half an hour, the two coyotes that had alternately scavenged the deer plus one of the two observer coyotes departed. The fourth animal then approached and ate the frozen meat for about 20 minutes before departing in the same direction as the others.

On 28 December, a single coyote was observed at one carcass (the other carcass had been removed by this time). Twelve magpies were also present; however, the coyote excluded the magpies from the carcass. The magpies attempted to approach the carcass on many occasions, but the coyote chased them about 10 yards whenever a bird approached. Uninterrupted feeding by the coyote lasted less than one minute. When chased, the magpies would scatter ahead of the mammal, which occasionally leaped several feet into the air after a bird. The coyote failed to capture any magpies. The coyote fed on the deer until about 12:30 p.m., when a car approached our house, and the coyote left. The magpies resumed feeding after the coyote's departure.

On 31 December, a single coyote ran towards and then chewed on the frozen carcass. It was first observed at 11:28 a.m. and it departed at 12:51 p.m. The temperature at this time was -43°C. It departed in a direction differing from than of its approach. At that time there were no magpies in the vicinity of the deer carcass.

At 2:30 p.m., 31 December, an additional 20 pounds of venison and antelope meat were put at the location formerly occupied by the deer carcasses. Although tracks indicated that this meat was removed by coyotes during the evening of 31 December, the actual removal was not observed.

# LETTERS

## KAMIKAZE, THE SWAINSON'S HAWK

I write in response to Jeremy Baumbach's letter describing his experience with a Swainson's Hawk at Last Mountain Lake National Wildlife Area (NWA) (*Blue Jay* 50:233-234). I could empathize completely with his account of events.

Judging by his description of the bird and place he undoubtedly made the acquaintance of "Kamikaze," she lives near the east boundary of the NWA. Members of the public usually concentrate in the vicinity of the Regional Park, wetland basins of the interpretive trails so Jeremy is the first non-staff person I know of that she has attacked.

Many people who have conducted field work at Last Mountain Lake NWA have had startling encounters with this bird. Her aggression within her territory is legendary among the staff. Her past exploits include knocking one student off his moving all-terrain vehicle and numerous displaced hats and rearranged hair cuts not to speak of untold psychological damage. She usually balls up her talons before striking at your head but there have been several cases of scalp or facial lacerations. She inevitably takes you completely by surprise. The startling effect of a blood-curdling shriek and the feel of talons passing through your hair is not as visible as a cut but I feel it is a "scar" that takes a long time to heal.

She has been terrorizing the unwary for five or six years that I am aware of; Wayne Harris told me she has been there for at least eight years.

All populations of raptors have a range of behaviour and a small percentage of the population is particularly aggressive. Kamikaze is an example of an extreme individual. Her defense of her territory would appear to have reached the point of being counter-productive. She attacks virtually anything within a certain radius of her nest and if the object of her fury remains she continues to harry it for as long as it takes to drive it out (she stoops my truck when I get in to leave). Wayne Harris tells me she has never successfully raised young. I doubt she is attentive to her nest long enough to satisfactorily perform incubation duties. Her mate never participates in attacks but circles with her or perches nearby. The female of another pair, two miles north of Kamikaze's territory, also stoops and harasses any intruder but she aims her attack several metres above your head and never actually strikes. It would be interesting to do genetic fingerprinting and see if these two females are related.

Jeremy wondered what prompted the attack. His presence in her territory was all it took. Most hawks are not like Kamikaze but since raptors are large powerful birds it would be wise to always be aware of their location.

Jeremy also wondered if his yelling and waving his hat scared her away. Yes and no. He would have been watching her while screaming. Kamikaze prefers sneak assaults and never attacks when we are looking at her. A glance in her direction every minute or so keeps her circling and watching for an opportunity. The flaw in this method is if you wait too long

*Swainson's Hawk* *Gilberta Liebelt*

and turn to look late in the attack you may be badly hurt. Carrying something over your head acts as a deterrent or at least directs the assault to a distance over your head. I performed surveys every other week in the vicinity of her nest so there was no avoiding being attacked. I carried metre long marker flags over my head. Her strike would knock them out of my hand but that was preferable to a blow to the head.

I hope Jeremy returns to Last Mountain Lake to watch birds. There are many quality wildlife experiences waiting for him there but if he ventures near Kamikaze he had best keep an eye on the sky.

*Brenda Dale*, 210-4999 98th Avenue, Edmonton, Alberta. T6B 2X3

## STRANGE NESTING BEHAVIOUR

In March 1991, in a stand of trees on a field near a slough, a Great Horned Owl was sitting in an old hawk's nest. About 24 April, we noticed that the nest had become much larger. Checking, we found a Ferruginous Hawk on the nest. On 1 May, we drove by to see if the hawk was still on the nest. What we saw was hard to believe — there was a Canada Goose on the nest. Later that afternoon a hawk was seen diving at the goose on the nest; the goose gave a weird call. In response to her call, the goose's mate took off in a hurry from a slough 1/4 mi. away.

The following day the goose was on the nest and all seemed well. A week later, Larry (my son) was working the field and noticed two goose eggs on the ground near the nest.

We drove by and found the pair of Canadas in the field and part of the nest torn down — as if something heavy tried to climb into it. Three eggs were on the ground.

Has anyone else seen different species of birds occupying the same nest in the same year?

At first we wondered what eggs were in the nest — owl, hawk, or goose. And, how did the goose manage to take over the nest from the hawk? (We are too old to be climbing trees. I would have loved to peek into that nest.)

On another field, in a small stand of poplars, a pair of Swainson's Hawks nested. In August we noticed that the leaves were all stripped off the trees, apparently by a small beetle, leaving the nest with two young hawks exposed to winds and the hot sun. They tried to keep cool by standing in the nest with wings outstretched. A week later one of the young was on the ground (fell or jumped) and found shade in the tall grass and weeds under the trees; the other was standing at the side of the nest and two days later was seen perched on a branch.

The beetle was about the size of a ladybug, brown with black stripes and dots. I saved a few beetles for identification.

*Flossie Bogdan*, Box 207, Avonlea, Saskatchewan. S0H 0C0

## GREAT EGRET

It was interesting to note where Mrs. Priestly had included notes on the Black-billed Magpie in 1943. Apparently, they weren't common at Yorkton at that time. Now they have become quite common in the Swan River Valley, Manitoba, since I came here in 1960. I now see them all the way to east of Winnipeg.

I am writing to you of my wife and I seeing a Great Egret on 29 September 1992 in a pothole along the east side of Highway #9, just a few miles north of the Yorkton airport. It was quite unconcerned as it kept feeding while we sat and watched it. We are not skilful enough to be able to determine if it was an immature male or an adult. We wonder if it could have been associated with the Fulton Marsh further south. These birds have been nesting in Dog Lake, Manitoba, for the past few years. This marshy area would be the equivalent of the Fulton Marsh in habitat but about 160 miles further west and 40 miles further north.

Are there many sightings of the Great Egret in Saskatchewan and is it known if they are nesting there?

*Hugh Hornbeck*, Box 1480, Swan River, Manitoba. R0L 1Z0

## AN UNUSUALLY TAME CANADA GOOSE

I would like to share a true story about a Canada Goose. My husband, Skip Irvine, spends most of the summer months at our cabin at Emma Lake, where he feeds a variety of birds. He began by feeding ducks down at the water, but now they come up to feed under our winter bird feeder, where there are plenty of sunflower seeds on the ground.

In August 1992 Skip had a Canada Goose follow him up from the lake and onto the deck of our cabin. He rushed into the cabin, got his camera and put some bread on the deck. The goose wandered around on the deck, checking things out, and making honking noises. My husband kept talking to it and trying to imitate the goose honks himself.

The goose ate the bread, and before long ate bread out of my husband's hand and out of his shirt pocket. He was able to stroke the goose under its bill and neck. The goose responded like a cat, by stretching its neck and seemed to enjoy all the attention it was getting.

My husband hoped no one was watching, as he felt somewhat foolish. But he did get some good closeup photographs of the goose.

I grew up on our farm, between Chelan and Kelvington, and we got our mail at Kinloch post office. My mother, Mrs. Linda Rodenburg, has been a member of the Saskatchewan Natural History Society for many years, participating in the Cooperative Spring Migration Survey, and contributing six notes to the *Blue Jay* between 1952 and 1962. She contributed records to Don Hooper's recent book, *Birds of East-Central Saskatchewan, Kelvington to Kelsey Trail*. At 89, she is no longer able to see birds, but she still loves to hear us talk about them. We have become interested in birds because of her.

*Barbara Irvine*, 624 East Place, Saskatoon, Saskatchewan. S7J 2Z3

## Saskatchewan Amphibian Monitoring Project: Volunteers Wanted for Roadside Surveys

The Saskatchewan Amphibian Monitoring Project (SAMP) is part of a national and international effort to monitor amphibian populations in various regions. Some species have demonstrated dramatic declines in some areas. In prairie Canada there has been a recent decline in the number of Northern Leopard Frogs. However, there is almost no data to confirm the decline and status of this species, or the other five species of frogs and toads in Saskatchewan. Habitat loss from wetlands filling and draining, the effects of toxic chemicals, and the action of increased ultraviolet radiation upon amphibian reproduction are some of the issues of concern.

A roadside monitoring project similar to the Breeding Bird Survey has been developed to provide long-term monitoring of amphibians. This project requires the help of the many naturalists associated within the Saskatchewan Natural History Society (SNHS) and the local societies. The survey routes are short (10 stations 1/2 mile apart) and can be surveyed within two hours starting at sunset. They will be established near your home to minimize any travel time and to be convenient for surveying, possibly in areas which you may already visit regularly (e.g., favourite birding area). The route is surveyed three times within a six-week period from mid-April to the end of May. Survey instructions, data sheets and a cassette tape for identification of the six species of frogs and toads are provided.

This is an ideal way to spend some time in the outdoors during those beautiful spring evenings when life is awakening on the prairies and the spring migration of birds is underway, and this can be a fun family activity as well. You can contribute in providing important information to monitor these little-known species which are important indicators of the environment's health.

If you are interested in participating in this new SNHS program please contact the following for more information:

Saskatchewan Amphibian Monitoring Project
Andrew Didiuk, Saskatchewan Coordinator
314 Egbert Avenue
Saskatoon, Saskatchewan S7N 1X1
Tel.: (306) 373-2213 (home)/(306) 975-4087 (office)/FAX: (306) 975-4089

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